

Wildlife Reports 2011

Wind Cave National Park



Purpose and Need:

The following short reports are a compilation of surveys primarily conducted by park resource management staff (wildlife branch) with the assistance of volunteers, and mainly for calendar year 2011. The reports are meant to inform the readers of the many and varied wildlife resources within this 33,851 acre Nat'l Park. This document will be added to the park library and the resource management files for documenting the accomplishments during calendar year 2011 as well as 2010 data if pertinent. Please contact the staff listed below for additional information, data sheets, copies of complete reports or other reference materials mentioned in the document.

There are other important monitoring efforts underway through the Northern Great Plains Inventory and Monitoring Program, Rocky Mountain Bird Observatory, USGS in Jamestown, ND, Black Hills State University, University of Missouri, University of South Dakota, South Dakota State University. See section "Wildlife Related Research Projects" for further details.

Wildlife Management staff responsible for providing the reports for this document:

Dan Roddy (Biologist) - Permanent Full Time

Barbara Muenchau (Biological Science Technician) - Permanent Full Time

Duane Weber (Biological Science Technician) - Term Position

Note: All photos within this document are NPS photos unless otherwise noted!

Table of Contents

BIRD REPORTS:	9
Sharp-tailed Grouse Lek Surveys	9
Breeding Bird Survey (USGS Roadside).....	11
Roadside Breeding Bird Survey Comparisons (1998-2011)	13
Off Road Breeding Bird Survey Point-Transects	16
Nightjar (Poorwill and Nighthawk) Surveys 2009-2011	19
Raptor Survey:.....	21
Owls 2011:	22
Vultures, Accipiters, Buteos, Eagles, Falcons (Active nests in 2011):	26
Christmas Bird Count Results 2011.....	28
Other Bird Reports of Interest:	31
BISON REPORTS:.....	33
"NO" Bison Capture in 2011 nor 2010	33
Bison Research Report:	33
Bison Miscellaneous:.....	34
Bison Computer Program:.....	35
Bison Mortalities Documented in 2011	35
ELK REPORTS:	38
USGS / Wind Cave National Park Elk Project (2011)	38

Elk Jump Gates:	39
Elk Fence - Trail Year in 2011:	39
Trail Camera Surveillance of Elk Jump Gates	40
Mountain Lion Study with SD Game Fish and Parks:	41
CWD Testing in 2010-2011 (within Wind Cave NP)	43
Elk Calf/Cow Counts	44
PRONGHORN REPORT:	45
Survey Results from 2010 and 2011	45
PRAIRIE DOG REPORTS:	46
Flea / Plague Study	46
"Dusting" Effort for flea control	46
Prairie Dog Colony Status Report:	48
BLACK-FOOTED FERRET REPORTS:	50
Black-footed Ferret Reintroduction Effort:	50
Monitoring Efforts for Black-footed Ferrets in 2011	50
List of all Ferrets Identified in 2011	52
Environmental Education / Outreach Programs Dealing with B.F. Ferrets:	52
BATS:	53
White-nose Syndrome (WNS)	53
White-Nose Syndrome Response Plan-Wind Cave National Park	53
Bat Hibernacula Survey - 2011.- Wind Cave National Park:	54
HERPS:	57
Tiger Salamander Study at Wind Cave National Park	57
Other Herps (Snakes):	58
OTHER UNUSUAL WILDLIFE SIGHTINGS:	59
PRECIPITATION REPORTS:	61
RESEARCH COORDINATOR RESPONSIBILITIES:	63
WILDLIFE RELATED RESEARCH PROJECTS:	64
RESEARCH PERMITS FOR CY 2011	69
Vegetation Related	69
Wildlife Related	70
Physical Science Related	71

AGREEMENTS (WILDLIFE RELATED):	72
RESEARCH PAPERS, CONTRIBUTIONS, OUTREACH / PUBLIC CONTACTS, MEETINGS, PRESENTATIONS	72
INFORMATION REQUESTS:	75
VOLUNTEER HOURS HELPING WITH WILDLIFE OPERATIONS:	75



The landbase of the park was increased in 2011 by 20% with the acquisition of 5,556 acres of forest and range lands. Eighty more acres of BLM property will eventually be added to the park, increasing the total acreage of the park to 33,931.

Photo 1. View from southern end of new lands looking east towards Buffalo Gap



Photo 2. Sun setting over northern end of new lands looking down lower Beaver Creek

Figures

	Page
Figure 1. Wind Cave National Park Christmas Bird Count Area (15 mi diameter).....	28
Figure 2. Prairie Dog acres/Precipitation Correlation from 1995 – 2011.....	48
Figure 3. North Boundary Colony 2009/10 compared with 2011/12GPS mapping.....	49
Figure 4. 60 year monthly precipitation averages compared with 2011 monthly.....	62
Figure 5. 1952-2011 annual precipitation (60 year average = 18.07).....	63

Tables

	Page
Table 1. Summary of the maximum number of birds using the known grouse lek.....	10
Table 2. Summary of bird species observed in 2011 as well as the number of stops each species was observed.....	12
Table 3. Comparison of species and total birds observed from 1998 – 2011.....	15
Table 4. 2011 Results – Bird species found on 5 off-road bird transects (BBS-Breeding Bird Survey).....	18
Table 5. Route #1 Results of Annual Nightjar Surveys (years 1-3).....	19
Table 6. Route #2 Results of Annual Nightjar Surveys (years 1-3).....	21
Table 7. Summary of Active Raptor Nests that were located in 2009-2011.....	22
Table 8. List of species observed during the 2011 CBC.....	29
Table 9. Comparison table – acres, burrows dusted, hours, cost,.....	47
Table 10. All ferrets observed during 2011 calendar year - Spring and Fall surveys.....	52

Photos

Photo 1. View from southern end of new lands looking east towards Buffalo Gap.....	4
Photo 2. Sun setting over northern end of new lands looking down lower Beaver Creek.....	4
Photo 3. Sharp-tailed Grouse (male).....	9
Photo 4. Two male grouse dancing for 4 females.....	9
Photo 5. Adult Yellow Warblers perched above nest.....	16
Photo 6. Richard Peterson (researcher) sets up point number 8 along the Rankin Ridge off-road Breeding Bird Survey transect.....	16
Photo 7. Common Nighthawk in flight.....	20
Photo 8. Great-horned Owls making use of an unused eagle nest to raise 2 owlets.....	23
Photo 9. Adult Long-eared Owl watching over owlets near nest site (May 25, 2011). Three owlets had fledged and 2 were still up in the nest.....	23
Photo 10. 4-5 week old Long-eared owlet – fledged from nest but wing cords not developed enough for sustained flight.....	24
Photo 11. Long-eared owlet 7-10 weeks old.....	25
Photo 12. Burrowing Owl nest site in prairie dog burrow (note whitewash and 2 owl pellets)...	25
Photo 13. Adult Burrowing Owl with 3 owlets on prairie dog colony, eastern side of park.....	26
Photo 14. Adult Prairie Falcon perched near nest site.....	27
Photo 15. Participants in the 2011 Wind Cave Christmas Bird Count.....	30
Photo 16. Adult Gray Jay sitting on nest in southwestern section of the park on 3-18-11.....	31
Photo 17. Feeders on Elk carcass.....	31
Photo 18. Long-billed Curlew 7-21-11 on Southeast prairie dog colony.....	32
Photo 19. Nest cavity approximately 4' off ground	32
Photo 20. Black-backed Woodpecker nestling (6/30/11).....	32
Photo 21. Bison cow and calf resting in prairie dog colony along Highway 87.....	33

Photo 22. Bison calf few weeks old.....	34
Photo 23. Twelve year old cow off NPS 6.....	35
Photo 24. Bison calf completely scavenged.....	35
Photo 25. Twenty-one year old bison cow.....	36
Photo 26. Bison bull near bison jump.....	36
Photo 27. Bison bull died in mud hole.....	36
Photo 28. Eight year old bison cow found dead near the Beaver Creek sinkhole.....	37
Photo 29. 14 year old bison bull near Air Quality Station.....	37
Photo 30. Duane Weber (NPS-in green) and Dr. Glen Sargeant (USGS-in brown) packing nets in preparation for netting gunning operation to capture elk in the park. February 2011.....	38
Photo 31. Double wide Elk Jump Gate in the down position. Located on the West boundary fence.....	39
Photo 32. The closed gate even keeps two rutting bulls apart (Elk Mountain Elk Jump Gate).....	40
Photo 33. A young cow elk shows how it's done, with more to follow.....	41
Photo. 34. Duane Weber gathers data at a Mt. Lion kill site using the Juno GPS unit. The victim was a young White-tailed deer killed by female F250.....	42
Photo 35. Duane Weber carrying elk head out of the backcountry for CWD testing as well as removing elk head and antlers to keep from being stolen by antler poachers.....	43
Photo 36. Elk calf – few weeks old.....	44
Photo 37. Monitoring elk herd for calf/cow counts.....	44
Photo 38. Two adult female Pronghorn with a Pronghorn kid in background.....	45
Photo 39. Twin Pronghorn kids just a few weeks old.....	45
Photo 40. and Photo 41. Black-footed Ferrets and prairie dogs are highly susceptible to plague.....	46

Photo 42. Biological Science Technician Duane Weber prepared for a day of dusting prairie dog burrows.....	47
Photo 43. NPS employees Duane Weber (foreground) and Kelly Mathis applying DeltaDust insecticide into prairie dog burrows on Bison Flats.....	48
Photo 44. Black-footed Ferret tracks leading from prairie dog burrow to prairie dog burrow..	50
Photo 45. Ferret trapped, ready to be transported to anesthesia trailer for exam and micro-chip ID.....	51
Photo 46. Once anesthesia wears off the ferret is returned to the same prairie dog burrow that it had been trapped.....	51
Photo 47. Close up of Black-footed Ferret.....	51
Photo 48. Coyote Cave entrance Photo by Brad Phillips.....	56
Photo 49. Tiger Salamander (<i>Ambystoma tigrinum</i>).....	57
Photo 50. An 8” long Tiger Salamander on its way to Bison Flats Pond during the spring breeding season	58
Photo 51. Duane Weber moving Prairie Rattlesnake from sidewalk.....	58
Photo 52. Pale Milksnake.....	59
Photo 53. Bighorn Sheep on the Wind Cave National Park side of the fence.....	59
Photo 54. Adult Mountain Lion with 2 kittens walking the fence-line on 9/8/2011.....	60
Photo 55. Mountain Lion jumping boundary fence between Wind Cave NP and USFS property 9/8/2011.....	60
Photo 56. Mountain Lion on USFS side of fence on 11-20-11.....	61
Photo 57 and 58. Duane Weber taking advantage of an educational opportunity to show off a Pale Milksnake to park visitors.....	74
Photo 59. Baby badger with mom.....	76

BIRD REPORTS:

Sharp-tailed Grouse Lek Surveys

Sharp-tailed Grouse lek (dancing ground) surveys are conducted in April to obtain counts of birds using the leks. This information is used in the development of population trend data for Sharp-tailed Grouse within the park.

The peak of attendance by females on the leks is generally April 8 – 22nd in South Dakota although due to weather conditions, earlier or later in April may be just as productive. This timeframe normally yields the highest number of birds with both males and females spending time on the leks. Once the females are mated, they no longer have a need to visit the leks, while the male grouse continue dancing into May for additional females that may have not been mated during the peak time period.



Photo 3. Sharp-tailed Grouse (male)



Photo 4. Two male grouse dancing for 4 females

2011 Survey Results:

The number of Sharp-tailed Grouse using the leks continues to decrease. Only 1 of 13 leks had birds on them in 2011. The maximum number of birds on the lek was 11 (9 males and 2 females) on April 5th. Lek #6 on the northern end of the park, did not have any birds on it, which is the first time since its discovery in 1997. The maximum number of birds on lek #6 was in the spring of 2007 when 19 birds were observed on the lek.

Interesting to note that during the Christmas Bird Count on December 12, 2010 there were 52 grouse counted in the park. Throughout the rest of the winter of 2010-2011 there were numerous sightings of grouse, mainly on the southern end of the park. The biggest counts were 16 on Jan. 31st and March 21st and 11 on March 18th. There were also 16 grouse observed close to a known

lek on the southern end of the park on March 21st but they did not stay and make use of the lek. There have not been grouse using any of the 5 leks on the southern end of the park since 2007.

As mentioned above, it appeared that grouse moved into the southern end of the park during the winter of 2010-2011 but once the weather broke they moved beyond the park and did not make use of the leks in the park. Another possibility is that a late winter storm may have caused problems for the grouse since there were so few on the leks in the spring. Weather is a big driver limiting the number of birds that survive and make it to the leks in the spring.

Reviewing the park files, it appears that the first attempt to survey grouse leks in the park was undertaken in May, 1984. There were 4 known leks at the time (1 on the southern end of the park and 3 on the eastern half). A total of 18 birds were observed (5 on the southern end of the park / 13 on the eastern half). These limited surveys were conducted in the latter half of May compared to the April timeframe which is now being followed. The April timeframe seems to be universally recognized in South Dakota as the best time for recording maximum numbers of birds on the leks.

For comparison purposes: Over the past 12 years, there have been 7 concerted efforts to survey all of the known grouse leks in the park during the months of March/April/May. Usually the trend data is developed from the number of males using the leks in the spring but data dealing with the male grouse has often times been incomplete or unreliable. The numbers below only reflect the total number of Sharp-tailed Grouse on the leks. Even with the less than optimal data, it is still apparent that the number of Sharp-tailed Grouse using the known leks in the park has decreased substantially over the past 12 years.

Date	Max # Birds	Southern end of Park	Eastern half of Park	Comments
1999	91	37	54	Active leks (3 southern / 4 or 5 eastern)
2004	56	19	37	Active leks (2 southern / 4 eastern)
2007	57	08	49	Active leks (1 southern / 4 eastern)
2008	16-18	00	16-18	Active leks (0 southern / 2 eastern)
2009	17	00	17	Active leks (0 southern / 3 eastern)
2010	14	00	14	Active leks (0 southern / 3 eastern)
2011	11	00	11	Active leks (0 southern / 1 eastern)

Table 1. Summary of the maximum number of birds using the known grouse leks in the park

Breeding Bird Survey (USGS Roadside)

Conducted by Duane Weber, 6/15/2011, 48-73° F., Clear skies

History:

The roadside survey methodology for the North American Breeding Bird Survey (BBS) was formally launched in 1966 when approximately 600 surveys were conducted in the U.S. and Canada east of the Mississippi River. The survey has since spread and today there are approximately 3700 active BBS routes across the continental U.S and Canada, of which 2900 are surveyed annually. These surveys collect information on the distribution and abundance of breeding birds, and monitor population changes over time and climactic fluctuations.

Breeding Bird Surveys are conducted primarily in June, during the peak of the nesting season. Each route consists of a total of fifty stops located in 0.5 mile intervals along a 24.5 mile route. A three-minute point count is conducted at each stop, during which the observer records all birds heard or seen within the 0.25 mile of the stop.

The official Wind Cave National Park BBS route was established and run by Richard Peterson in 1998. For the past 13 years these annual surveys have been conducted by Barbara Muenchau and Duane Weber.

This additional information continues to be added to the park database for developing trend data for bird populations in the park.

Table 2 below shows the bird species that were observed in 2011, as well as the number of stops each species was observed. An overall total of 529 individual birds were seen of 53 species.

Table 3 is a comparison of the species and total birds observed during the BBS from 1998-2011.

SPECIES	Total /Species	# Stops Species Observed
Wild Turkey	1	1
Red-tailed Hawk	2	2
Golden Eagle	1	1
American Kestrel	3	2
Killdeer	2	2
Upland Sandpiper	7	7
Mourning Dove	29	22
Burrowing Owl	1	1
Common Nighthawk	1	1
Red Headed Woodpecker	2	2
Hairy Woodpecker	4	4
Northern (Red-shafted)Flicker	4	4
Western Wood-Pewee	9	6
Cordilleran Flycatcher	2	2

(Cont.) SPECIES	Total /Species	# Stops Species Observed
Say's Phoebe	1	1
Western Kingbird	1	1
Eastern Kingbird	8	5
Plumbeous (Solitary) Vireo	1	1
Warbling Vireo	3	2
Black-billed Magpie	3	3
American Crow	22	17
Cliff Swallow	2	1
Barn Swallow	3	2
Black-capped Chickadee	2	1
Red-breasted Nuthatch	10	8
White-breasted Nuthatch	1	1
Rock Wren	1	1
House Wren	14	9
Eastern Bluebird	4	2
Mountain Bluebird	13	8
American Robin	27	15
Brown Thrasher	5	4
European Starling	11	6
Cedar Waxing	12	1
Yellow Warbler	4	3
Audubon's Warbler	3	3
Common Yellowthroat	1	1
Yellow-breasted Chat	5	5
Western Tanager	4	3
Spotted Towhee	12	7
Chipping Sparrow	7	6
Field Sparrow	1	1
Vesper Sparrow	31	18
Lark Sparrow	1	1
Grasshopper Sparrow	5	5
Black-headed Grosbeak	6	5
Lazuli Bunting	1	1
Red-winged Blackbird	4	3
Western Meadowlark	183	41
Brewer's Blackbird	21	10
Common Grackle	6	1
Brown-headed Cowbird	1	1
Red Crossbill	21	7
Total Bird	529	
Total Species	53	

Table 2. Summary of bird species observed in 2011 as well as the number of stops each species was observed

Roadside Breeding Bird Survey Comparisons (1998-2011)

Surveyors Richard Peterson, Barbara Muenchau, Duane Weber

SPECIES Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mallard	2	1	2	0	0	1	1	0	0	0	2	3	0	0
Blue Winged Teal	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sharp-tailed Grouse	0	0	0	0	0	1	0	1	0	0	0	0	0	0
Wild Turkey	2	1	3	0	4	4	1	7	1	14	5	6	13	1
Great Blue Heron	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Turkey Vulture	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Sharp-shinned Hawk	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Cooper's Hawk	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Red-tailed Hawk	1	0	0	0	0	0	0	0	2	0	1	1	0	2
Golden Eagle	0	1	0	1	0	0	0	0	0	0	1	0	0	1
American Kestrel	3	3	0	1	0	0	6	3	5	0	4	3	2	3
Prairie Falcon	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Killdeer	0	0	1	0	0	1	0	4	2	5	1	5	0	2
Upland Sandpiper	6	4	6	1	7	7	15	9	10	12	6	2	4	7
Long-billed Curlew	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Wilson's Snipe	0	3	2	1	0	0	0	0	0	0	0	0	0	0
Mourning Dove	5	10	10	2	3	10	10	10	12	18	18	9	23	29
Great Horned Owl	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Burrowing Owl	0	0	0	0	0	1	0	1	1	0	0	0	0	1
Common Nighthawk	3	6	3	1	2	4	5	5	7	12	4	3	8	1
Lewis's Woodpecker	0	1	1	1	0	1	0	0	0	0	0	0	0	0
Red Headed Woodpecker	0	0	0	0	0	2	0	1	0	0	0	4	3	2
Downy Woodpecker	0	0	1	0	0	0	1	0	1	0	0	0	0	0
Hairy Woodpecker	3	0	1	0	1	1	1	1	0	1	1	1	1	4
Blk Backed Woodpecker	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Northern (Red-shafted) Flicker	7	4	2	5	1	2	2	3	4	4	1	6	7	4
Western Wood-Pewee	11	3	11	6	6	8	6	4	3	5	6	8	6	9
Dusky Flycatcher	2	1	2	2	1	3	2	1	1	1	1	1	0	0
Cordilleran Flycatcher	2	0	4	0	0	0	1	2	1	1	1	0	1	2

Cont'd 1998-2011 BBS	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Say's Phoebe	0	0	0	0	0	0	0	0	0	1	1	1	2	1
Western Kingbird	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Eastern Kingbird	4	1	0	1	2	1	3	5	3	7	5	2	3	8
Plumbeous (Solitary) Vireo	2	3	6	3	1	4	4	6	2	2	5	8	6	1
Warbling Vireo	1	1	4	2	2	4	1	6	5	4	2	3	2	3
Gray Jay	0	0	0	0	0	0	1	0	0	0	3	0	0	0
Clark's Nutcracker	1	1	2	0	0	0	0	1	0	0	0	0	0	0
Black-billed Magpie	2	2	0	1	4	0	3	5	1	7	6	7	4	3
American Crow	21	18	16	11	17	34	22	41	19	37	21	20	25	22
Horned Lark	0	0	0	0	0	0	0	0	0	0	4	0	0	0
Violet-green Swallow	0	0	0	0	0	3	0	0	1	0	2	1	0	0
Northern Rough-winged Swallow	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Cliff Swallow	0	0	0	0	4	3	16	0	1	0	1	3	0	2
Barn Swallow	0	3	0	0	0	1	0	1	0	2	5	1	1	3
Black-capped Chickadee	11	6	5	1	1	0	3	9	11	6	4	5	5	2
Red-breasted Nuthatch	7	11	7	5	13	13	11	12	13	15	15	21	18	10
White-breasted Nuthatch	0	2	1	0	2	2	1	2	1	4	3	5	2	1
Pygmy Nuthatch	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Brown Creeper	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Rock Wren	0	0	1	1	1	2	9	1	3	1	10	5	2	1
House Wren	2	4	3	7	5	5	8	8	5	12	4	8	7	14
Eastern Bluebird	1	1	2	0	1	1	1	2	3	0	2	0	0	4
Mountain Bluebird	5	3	1	3	0	4	9	9	18	9	18	18	10	13
Townsend's Solitaire	0	0	0	3	2	1	5	2	1	1	1	0	0	0
Veery	0	0	0	0	0	0	0	0	1	0	0	0	0	0
American Robin	22	14	26	13	19	23	28	26	30	33	28	30	33	27
Gray Catbird	1	0	0	1	0	0	0	3	0	0	2	1	1	0
Brown Thrasher	4	3	4	2	3	1	4	3	8	3	4	2	4	5
European Starling	4	7	1	3	1	8	13	13	18	3	11	10	18	11
Cedar Waxing	0	1	0	1	0	4	4	2	0	2	0	0	0	12
Yellow Warbler	4	9	5	1	3	4	5	6	3	3	5	4	4	4
Audubon's Warbler	7	5	9	4	7	5	3	7	2	3	1	2	7	3

Cont'd 1998-2011 BBS	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
American Redstart	1	2	0	1	0	0	0	2	1	0	0	0	0	0
Ovenbird	1	2	1	2	3	4	3	5	1	3	1	1	0	0
Common Yellowthroat	5	11	8	8	6	9	6	1	1	3	1	0	1	1
Yellow-breasted Chat	4	6	2	2	6	8	6	6	9	8	5	4	8	5
Western Tanager	5	5	7	10	11	15	16	14	12	16	16	18	7	4
Spotted Towhee	18	18	13	15	3	16	13	11	15	17	19	18	12	12
Chipping Sparrow	9	3	7	6	6	2	2	7	1	10	6	5	5	7
Field Sparrow	0	0	0	0	0	0	1	0	1	2	1	1	0	1
Vesper Sparrow	17	22	23	14	6	17	13	29	20	24	24	19	28	31
Lark Sparrow	1	1	0	2	0	0	14	0	0	0	0	2	3	1
Lark Bunting	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Grasshopper Sparrow	23	8	15	6	22	12	10	3	6	0	5	11	8	5
Song Sparrow	0	0	0	0	0	0	0	1	0	0	0	1	0	0
White-winged Junco	0	1	4	1	4	1	1	0	2	2	3	1	3	0
Black-headed Grosbeak	3	0	1	1	1	0	1	6	4	2	3	6	5	6
Lazuli Bunting	0	0	0	0	0	0	1	2	0	0	1	1	1	1
Indigo Bunting	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bobolink	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	25	28	16	22	13	6	6	4	2	4	3	3	2	4
Eastern Meadowlark	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Western Meadowlark	152	128	117	102	77	135	104	170	139	102	105	122	142	183
Brewer's Blackbird	21	11	14	3	17	12	16	26	17	61	29	8	18	21
Common Grackle	1	0	0	0	0	0	0	0	0	0	1	0	4	6
Brown-headed Cowbird	10	10	15	5	5	6	8	35	32	11	3	12	0	1
Orchard Oriole	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Bullock's Oriole	2	0	0	0	0	0	1	0	0	0	1	0	13	0
Red Crossbill	12	20	0	36	9	3	42	4	6	8	0	5	18	21
American Goldfinch	0	3	3	5	2	2	10	4	7	5	13	5	3	0
Evening Grosbeak	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Totals	457	414	388	326	307	420	482	555	480	506	459	452	504	529

Table 3. Comparison of species and total birds observed from 1998 - 2011

Off Road Breeding Bird Survey Point-Transects

Five off-road breeding bird surveys were conducted during the month of June in 2011. The five transects are along the Rankin Ridge Trail, Centennial Trail (through the burn), Cold Brook Canyon Trail, Wind Cave Canyon Trail and the Beaver Creek Trail. This is the thirteenth year the off-road surveys have been conducted. Of the 5 transects, Cold Brook Canyon had the highest numbers of species (40) with Wind Cave Canyon at 37 species, Beaver Creek at 33 species, Centennial trail at 26 species and Rankin Ridge at 24 species. The highest number of total birds were observed on the Cold Brook Canyon transect (375) with Wind Cave Canyon at 313 birds, Beaver Creek at 272 birds, Centennial trail at 252 and Rankin Ridge having 194 birds. The number of species and total birds observed on the five transects during the 2011 surveys can be found in Table 4.

Off Road BB Surveys conducted by Barbara Muenchau.



Photo 5. Adult Yellow Warblers perched above nest



Photo 6. Richard Peterson (researcher) sets up point number 8 along the Rankin Ridge off-road Breeding Bird Survey transect

The primary criterion for location of the points was to situate them in habitats not well represented along the Breeding Bird Survey (BBS) route which primarily covers the grassland habitats of the park. Therefore the points for the off road surveys, as much as possible, were located in ponderosa pine woodland/forest and deciduous riparian habitats. The points are at

least 250 meters apart. This follows the suggestions from (Ralph et al, 1993) on monitoring landbirds. These 5 routes, consisting of 10 points each, are conducted once during the breeding season (i.e. 5 mornings during the breeding season, 10 points/morning, beginning at sunrise). Observation methods and data recorded are described in Ralph et al , 1993, with data separated in time (3 minute and 5 minute) and space (<50 meters and > 50 meters) from the observer.

TOTAL BIRD SPECIES FOR ALL 2011 OFF ROAD BBS TRANSECTS WIND CAVE NATIONAL PARK

Conducted by Barbara Muenchau, Biological Science Technician

	Species	Rankin Ridge	Wind Cave Canyon	Centennial Trail	Cold Brook Canyon	Beaver Creek	Totals/ Species
1	Wild Turkey	1	7		3		11
2	Red-tailed Hawk				2		2
3	Prairie Falcon					2	2
4	Killdeer			2			2
5	Rock Pigeon				7		7
6	Mourning Dove	8	19	24	20	8	79
7	Common Nighthawk		1		1		2
8	White-throated Swift				7		7
9	Red-headed Woodpecker		2	26	1		29
10	Hairy Woodpecker	1		3		1	5
11	Northern Flicker (rs)	1	3	14	3	4	25
12	Northern Flicker (ys)			1			1
13	Western Wood-pewee	12	9	6	24	29	80
14	Least Flycatcher				1		1
15	Dusky Flycatcher	1	3		4	3	11
16	Cordilleran Flycatcher	1	2		1	5	9
17	Says Phoebe		1				1
18	Eastern Kingbird			8	2		10
19	Plumbeous Vireo		6		2	7	15
20	Warbling Vireo				1	3	4
21	American Crow	1	4			6	11
22	Horned Lark			1			1
23	Violet Green Swallow				26		26
24	Cliff Swallow				15		15
25	Barn Swallow						0
26	Black-capped Chickadee	18	20	8	19	12	77
27	Red-breasted Nuthatch	20	6	8	20	6	60
28	White-breasted Nuthatch		3	1	3		7
29	Rock Wren	2	2	5		4	13
30	Canyon Wren					1	1

**Cont'd 2011 Off-road
BBS Transects**

	Species	Rankin Ridge	Wind Cave Canyon	Centennial Trail	Cold Brook Canyon	Beaver Creek	Totals/ Species	
31	House Wren	4	26	20	29	35	114	
32	Mountain Bluebird	1	6	5	6	1	19	
33	Townsend's Solitaire					2	2	
34	American Robin	14	11	10	12	20	67	
35	Brown Thrasher		3				3	
36	European Starling				2		2	
37	Cedar Waxwing		2				2	
38	Yellow Warbler		23		11	24	58	
39	Audubon's Warbler	3		2	2		7	
40	American Redstart					2	2	
41	Ovenbird		5			8	13	
42	Common Yellowthroat					7	7	
43	Yellow-breasted Chat		8		1	5	14	
44	Western Tanager	5	4		6	4	19	
45	Spotted Towhee	8	32	3	24	30	97	
46	Chipping Sparrow	36	21	13	29	7	106	
47	Field Sparrow		10				10	
48	Vesper Sparrow	3	2	3	2		10	
49	Lark Sparrow	2	4				6	
50	Grasshopper Sparrow				11		11	
51	White-winged Junco	4	2		5	3	14	
52	Black-headed Grosbeak		2		11	3	16	
53	Lazuli Bunting		1			1	2	
54	Indigo Bunting		2		1		3	
55	Red-winged Blackbird			2			2	
56	Western Meadowlark		20	53	20	3	96	
57	Brewer's Blackbird		1	10	2		13	
58	Brown-headed Cowbird	13	21	1	20	16	71	
59	Red Crossbill	33		12	6	5	56	
60	American Goldfinch	2	19	11	13	5	50	
	Total birds/transect	194	313	252	375	272	1406	total birds
	Species/transect	24	37	26	40	33	60	total sp.

Table 4. 2011 Results – Bird species found on 5 off-road bird transects (BBS-Breeding Bird Survey)

Comparisons of all thirteen years per transect, can be found in the Park files.

Literature Cited:

Ralph, C.J., G. R. Geupel, P. Pyle, T. E. Martin and D. F. DeSante, eds. 1993. Handbook of Field Methods for Monitoring Landbirds. Gen. Tech. Rep. PSW-GTR-144. Albany, CA: Pacific Southwest Research Station, Forest Service, USDA. 41 pp.

Nightjar (Poorwill and Nighthawk) Surveys 2009-2011

In cooperation with a nationwide effort coordinated by the Center for Conservation Biology at the College of William and Mary and Virginia Commonwealth University, park staff established and have been surveying two 9 mile long, 10 stop, roadside nightjar survey routes since 2009. The objectives of the survey are to document the presence, absence, and relative abundance of Common Poorwills and Common Nighthawks, the two nightjar species expected at the park.

The routes were established on top of the USGS Breeding bird survey route already conducted at the park. Nightjar routes are run from late May – early July, after dark, under clear skies, close to the full moon period with the moon above the horizon.

2011 Results from the 2 routes within the park: 10 Common poorwills on 9 stops and 16 Common nighthawks on 9 stops. There were 5 stops where both poorwills and nighthawks were detected. There were 13 of the 20 stops that yielded at least one nightjar.

ROUTE #1	2009		2010		2011	
	Common Poorwill	Common Nighthawk	Common Poorwill	Common Nighthawk	Common Poorwill	Common Nighthawk
Stop #1	02	04	01	01	00	00
Stop #2	01	03	00	02	00	00
Stop #3	01	02	00	01	00	00
Stop #4	00	00	00	00	00	00
Stop #5	00	00	00	01	00	02
Stop #6	00	02	00	01	00	00
Stop #7	02	00	02	00	01	00
Stop #8	00	00	03	00	01	01
Stop #9	02	00	01	00	02	00
Stop #10	01	00	00	00	00	00
TOTAL BIRDS:	09	11	07	06	04	03
NUMBER OF STOPS:	06	04	04	05	03	02

Table 5. Route #1 Results of Annual Nightjar Surveys (years 1-3)

2011 Results of Route #1 (Wind Cave #81-911)

Conducted June 15, 2011

Yielded nightjars on 04 of 10 stops (one stop had both poorwill and nighthawk)

Common Poorwills on 3 stops (04 individuals)

Common Nighthawk on 2 stops (03 individuals)

Only 1 stop had both species of Nightjars



Photo 7. Common Nighthawk in flight

ROUTE #2	2009		2010		2011	
	Common Poorwill	Common Nighthawk	Common Poorwill	Common Nighthawk	Common Poorwill	Common Nighthawk
Stop #1	00	00	01	00	00	00
Stop #2	02	00	00	00	01	01
Stop #3	02	01	01	00	01	02
Stop #4	00	00	00	02	01	00
Stop #5	01	00	01	03	01	03
Stop #6	01	01	00	03	00	01

ROUTE #2	2009		2010		2011	
	Common	Common	Common	Common	Common	Common
	Poorwill	Nighthawk	Poorwill	Nighthawk	Poorwill	Nighthawk
Stop #7	00	01	00	03	00	02
Stop #8	00	00	00	03	00	01
Stop #9	00	02	00	03	01	00
Stop #10	00	01	00	02	01	03
TOTAL BIRDS:	06	06	03	19	06	13
NUMBER OF STOPS:	04	05	03	07	06	07

Table 6. Route #2 Results of Annual Nightjar Surveys (years 1-3)

2011 Results of Route #2 (Wind Cave #81-911-2)

Conducted June 15, 2011

Yielded nightjars on 09 of 10 stops

Common Poorwills on 06 stops (06 individuals)

Common Nighthawks on 07 stops (13 individuals)

4 stops had both species of Nightjars

Raptor Survey:

RM Staff members were able to visit 35 – 40 nest locations/territories of 11 different raptor species within the park. These territories include prairie dog towns, cliffs, forested, woody draws and shrublands.

Locations, availability and use of nests (reproductive success) by raptors varies from year to year depending on a variety of factors such as competition from other species (Great-horned Owls occupying nests previously used by Long-eared Owls or Cooper's Hawk before they've had a chance to re-nest), human activity in close proximity to nests or within nesting territories (fence construction or digging and installing new water lines), low prey/food availability, prescribed or naturally caused (lightning strike) fire and killing of trees or reasons unknown to the observer.

The nesting territories within the park are a combination of ones that have been documented during various studies over the past 20+ years along with the findings by the current resource staff. These territories may be representative of what is found throughout the park but by no

means are they all inclusive. There are some back-country, inaccessible areas that are not surveyed on a routine basis.

Active Raptor Nests during 2009-2011 breeding season

Species	2009	2010	2011
Great-horned Owl	00	00	01 (2 owlets)
Long-eared Owl	01 (2 fledglings)	00	01 (5 owlets)
Burrowing Owl	04	2-4	06 (17 owlets)
Golden Eagle	01	03	01
Cooper's Hawk	00	00	01 (1 fledgling)
Red-tailed Hawk	06 (7?)	05	01 (1 fledgling)
Prairie Falcon	00	01 (2?)	02 (5 fledglings)

Table 7. Summary of Active Raptor Nests that were located in 2009-2011

Many nesting territories of various species in the park are visited each year. In the past 3 years the following raptors were not located during the nesting season but have been found over the past 10 years to have nested in the park. The list includes Northern Saw-Whet Owl (2 prob.), Turkey Vulture, Northern Goshawk and Merlin. The most common nesting raptor in the park, the American Kestrel, is not tracked on an annual basis. Sharp-shinned Hawks are often times seen in the park in late spring and early summer but no documentation of them nesting in the park. Winter raptors include Bald Eagle, Northern Harrier, Ferruginous Hawk and Rough-legged Hawk. Spring and fall migrant includes Short-eared Owl. An Eastern Screech Owl was heard calling on the northern end of the park during the fall ferret surveys (Sept. 24, 2010) as well as a roadkill (red phase Screech Owl) found on Highway 385 (November 30, 2011). The park does not appear to have suitable habitat (lower elevation riparian habitat with large enough hardwood trees to provide cavities for nesting) to support Screech Owls. The new park lands (Casey addition) added in September 2011 may have more suitable habitat for Screech Owls. Wildlife staff will search the new lands for possible Screech Owl nesting habitat in 2012.

Owls 2011:

Four species of owls (Great-horned, Long-eared, Northern Saw-whet and Burrowing) are known to use the park for nesting in the late winter, spring and summer months.

Great-horned Owl – of the 5 known territories, 1 active nest was located. Very little time was put towards owl surveys this year by park staff.

2 Great-horned owlets in an unused eagle nest



Photo 8. Great-horned Owls making use of an unused eagle nest to raise 2 owlets

Long-eared Owl – of the 6 known territories, only 1 was found to be active (5 owlets were observed on May 25th – 3 had fledged and 2 were still in the nest) in 2011. See photos below. All owlets had fledged by June 8th. They remained in the area until July. In 2009, this same area had 2 owlets that were reported but the nest was never located. The actual nest (probably an abandon crow nest) was not located until 2 years later on May 25, 2011.



Photo 9. Adult Long-eared Owl watching over owlets near nest site (May 25, 2011). Three owlets had fledged and 2 were still up in the nest.



Photo 10. 4-5 week old Long-eared owlet – fledged from nest but wing cords not developed enough for sustained flight.



Photo 11. Long-eared owlet 7-10 weeks old

Burrowing Owl - located a total of 6 active nests in 2011. One prairie dog colony had 5 active nests that produced a total of 13 fledglings. The other colony which was less than 2 acres in size produced 4 fledglings. There were 2 other colonies that had burrowing owls on them but it appeared they did not remain long enough to successfully raise broods.



Photo 12. Burrowing Owl nest site in prairie dog burrow (note whitewash and 2 owl pellets)



Photo 13. Adult Burrowing Owl with 3 owlets on prairie dog colony, eastern side of park

Populations of Burrowing Owls have declined across the North American range. Primary threats are habitat loss and degradation and the reductions of burrowing mammal populations such as prairie dogs and ground squirrels. Additional threats include habitat fragmentation, predation, illegal shooting, pesticides and other contaminants.

Vultures, Accipiters, Buteos, Eagles, Falcons (Active nests in 2011):

Turkey Vulture – at least 3 known nesting areas in the park. Most of the nesting sites are inaccessible making it difficult to determine nesting success by the vultures.

Cooper's Hawk – of the 5 known territories in the park, only 1 was active in 2011. This area was unknown until May 2011. Interesting to note that one of the breeding pair (appeared to be the female) was a subadult with brown streaking on its breast and a yellowish/orangish colored iris. Other noteworthy details were the late nesting effort and having only 1 nestling (usually have 4-5). The nestling that was observed in the nest did not fledge until sometime between August 11th and August 22, 2011. Most records found for South Dakota list fledgling dates as mid-end of July.

Red-tailed Hawk – there was only 1 active Red-tailed Hawk nest in 2011 compared to 5 in 2010 and 6-7 in 2009. There were birds on some of the territories during the breeding season but apparently not using the known nests within those territories. It is possible the pairs may have constructed another nest in the same territory but with limited time on the part of the park staff they may have not found a newly constructed nest. The one active nest, a cliff nest, only had 1 nestling. It is also possible there may have been weather events that disrupted the nesting cycle this year or available prey species was less than optimal for nesting, etc.

Golden Eagle – only 1 eagle nest appeared to be active this year. There were other eagles observed in the area of the park but active nests or new nest sites were not found.

Merlin – of the 4-6 potential Merlin nesting sites in the park, there were none documented as active this year. Very little time was spent searching for these falcons in August (when the nestlings are leaving the nest and are quite vocal) due to other pressing issues in resource management such as dusting prairie dog colonies to keep plague from getting established.

Prairie Falcon – of the 3 regularly active cliff sites in the park, 2 were active in 2011. One site produced 3 while the other site produced 2 fledglings. One of the 2 active sites is a new location on the newly acquired Casey lands. There have been other Prairie Falcons observed in other canyons of the park but staff has not been able to document use of the cliffs in those canyons.



Photo 14. Adult Prairie Falcon perched near nest site

Christmas Bird Count Results 2011

Wind Cave National Park has been conducting a Christmas Bird Count (CBC) since 1995. It is patterned after the nationwide National Audubon Society effort to document trends in wintering birdlife throughout the United States. The CBC represents one of the longest-running wildlife census efforts in the world. When combined with other surveys, the results help biologists determine how bird populations have changed over time, and how they are responding to shifts in habitat and climate. The area covered is a 15 mile diameter circle.

In 2011, the Park adjusted its circle to include the “Casey Addition”, a 5,556 acre parcel of land added to the park in September 2011. The revised center of the circle (noted below in figure 1 by a small red dot) is now positioned south of the Rankin Ridge fire tower. The count covers all of Wind Cave NP and areas of the Black Hills National Forest and Custer State Park.

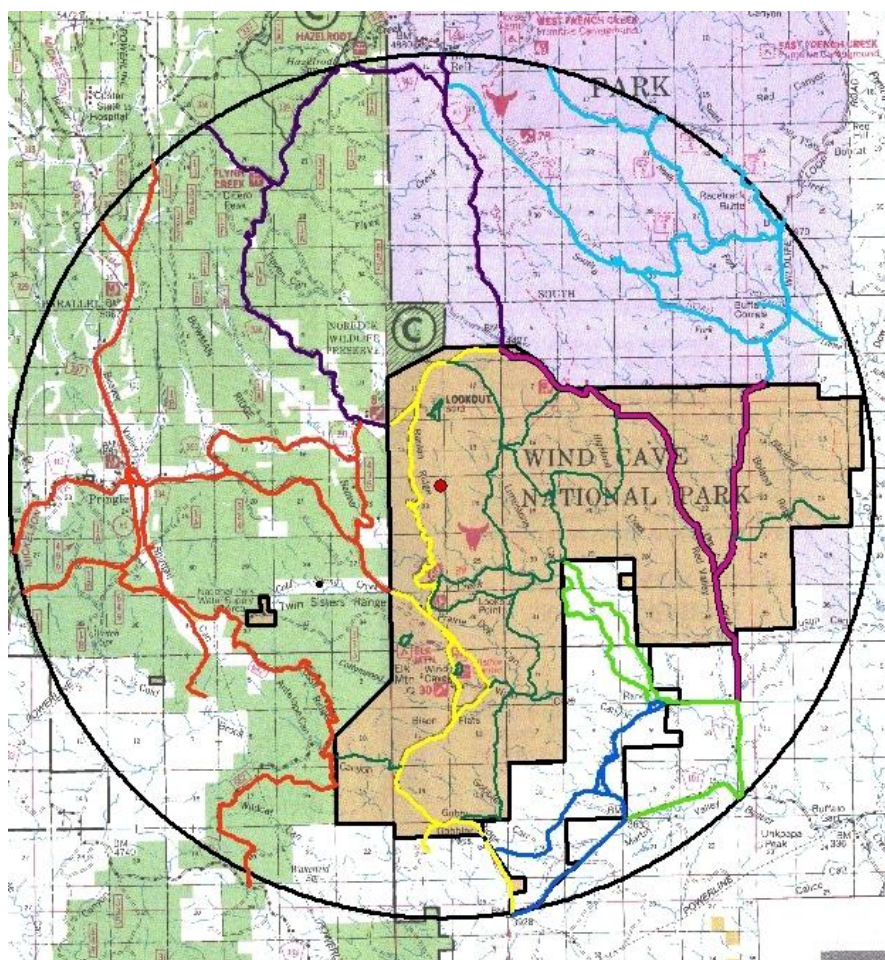


Figure 1. Wind Cave National Park Christmas Bird Count Area (15 mi diameter)

Results of 2011 Christmas Bird Count:

The “sixteenth” annual Christmas Bird Count (CBC) was held in the Park and surrounding area on December 18, 2011. The weather made for a beautiful day for birding with the temperatures ranging from 30 to 52 degrees Fahrenheit and winds 5-15 mph.

We had 14 participants divided into 7 groups. Total survey miles traveled were 246 miles. (Car miles were 216 and foot miles traveled were 30 miles.

The 7 survey groups counted **699 total birds** including **29 species**. In 2010 the CBC results included **1,000 total birds** and **28 species**. The 16 year average for total birds counted is 1095, and the average number of species observed is 32.

SPECIES	Wind Cave	Outside Park	TOTALS
Sharp-tailed Grouse	38	13	51
Wild Turkey	23	10	33
Bald Eagle	4	8	12
Northern Harrier	4	0	4
Red-tailed Hawk	3	3	6
Golden Eagle	3	2	5
Great Horned Owl	1	0	1
Downy Woodpecker	1	2	3
Hairy Woodpecker	4	1	5
Northern Flicker	6	0	6
Northern Shrike	2	2	4
Blue Jay	0	1	1
Black-billed Magpie	13	22	35
American Crow	13	21	34
Horned Lark	2	0	2
Black-capped Chickadee	99	68	167
Red-breasted Nuthatch	7	10	17
White-breasted Nuthatch	13	12	25
Brown Creeper	0	1	1
Canyon Wren	3	0	3
Townsend's Solitaire	7	2	9
American Robin	3	1	4
European Starling	4	16	20
American Tree Sparrow	10	6	16
Dark-eyed Junco (WW)	52	129	181
Red Crossbill	5	0	5
Pine Siskin	0	3	3
American Goldfinch	2	20	22
House Sparrow	0	24	24
OVER ALL TOTALS	322	377	699

Table 8. List of species observed during the 2011 CBC.

Some interesting observations/thoughts of this years' (2011) count:

- * No new species were observed this year
- * This was the highest count for northern harriers = 4 and red-tailed hawks = 6
- * Also the highest count for northern flicker = 6 and house sparrow = 24
- * Single observations include great horned owl, blue jay and brown creeper.
- * 2nd highest count of black-billed magpies = 35 (highest 64)
- * Tied for 2nd highest count of American tree sparrow = 16 (highest 18)
- * Tied for 2nd highest count of canyon wrens = 3 (highest 4)
- * Early morning owling was not conducted this year, but 1 Great-horned Owl was observed on the "Casey Addition".
- * This was the second year out of 16 that we did not observe any rock pigeons



Photo 15. Participants in the 2011 Wind Cave Christmas Bird Count

Many thanks to all those who participated in the 2011 Christmas Bird Count: Christy Bubac, Jody Davila, Seth Goodspeed, Kyle Kennedy, Neil Long, Mark Mazza, Dick Palmer, Dan Roddy, Jeff Simmons, Marsha Simmons, Jimmy Taylor, Sandy Taylor, Andy Thorstensen and Duane Weber. Participants enjoyed a pot-luck while tallying the numbers of birds and other observations made during the survey.

Next years' Christmas Bird Count will be Sunday December 16, 2012. See you there!

Other Bird Reports of Interest:



Photo 16. Adult Gray Jay sitting on nest in southwestern section of the park on 3-18-11



Bald Eagles (3 adults / 2 immatures)



Black-billed Magpies and Crows

ELK CARCASS – FOOD FOR OTHER SPECIES OF WILDLIFE

Golden Eagle (adult) and Black-billed Magpies



Coyotes



Photo 17. Feeders on Elk carcass



Photo 18. Long-billed Curlew 7-21-11 on Southeast prairie dog colony (3-4 sightings in July – early August 2011). “Probable” for nesting this year. This would be the first recorded nesting effort for the park. Adult bird scolded resource management staff during this time period. Bird(s) were making weird calls and demonstrating strange behavior i.e. divebombing staff and what looked like wing dragging. Adult bird would land close by staff and appeared to be trying to lure them away from the area with their calls and wing dragging (feigning injury like a killdeer would do when it was trying to lead a predator or a human away from their nest site).

First documentation of Black- backed Woodpecker nesting in the park (part of research project being conducted by Chris Rota from the University of Missouri)



Photo 19. Nest cavity approximately 4' off ground **Photo 20.** Black-backed Woodpecker nestling (6/30/11)

Black Terns (5-6) observed on Bison Flats pond on May 19, 2011

BISON REPORTS:

"NO" Bison Capture in 2011 nor 2010

Bison have not been captured (rounded-up) since October 2009. The bison herd in the park has not fully recovered to the point where a capture is necessary. The reason we bring the bison into the corrals in the first place is to remove animals from the park to keep the numbers down in an effort to avoid over utilization of the park vegetation. With our low number of bison, 350-375 as of December 2011, and the above average precipitation over the past 3 years, the need to remove bison from the herd is still unnecessary. The earliest another bison capture will be needed will most likely be October 2013.



Photo 21. Bison cow and calf resting in prairie dog colony along Highway 87

Bison Research Report:

Report received from Texas A&M, June 21, 2011. *“Development of a Genetic Based Conservation Management Program for the Wind Cave National Park Bison Herd”*. Electronic copies of this report are available from resource management. Highlights and recommendations from Texas A&M include the following:

- 1) Besides the historical significance of this population, the WCNP bison population has genetic significance as a repository for genetic diversity. This population is genetically distinct from other federal bison populations, harbors comparatively high levels of genetic diversity, and does not appear to be affected by the high levels of domestic cattle introgression known to exist in many private bison herds (Halbert and Derr 2007; Halbert and Derr 2008).

- 2) The 494 calves for which paternity was confirmed were produced by 122 sires ranging in age from 1 to 18 years at breeding, with the majority (52.4%) of calves produced by 6 to 9 year-old bulls at breeding. Interestingly, the distribution appears to be bimodal with a peak for the 1 year-old bull class and another peak for the 6-9 year old bull classes. Approximately 10.7% (53) of the calves were produced by bulls which were 1 year old at breeding, 5.9% (29) by 2 year-old bulls, and 2.4% (12) by 3-year old bulls. The proportions of calves produced by each age class increases again starting with the 4-5 year-olds, peaks for the 6-9 year-olds, and then tails off starting with the 10 year-old class.
- 3) Maternity was confirmed for approximately 78% (773/986) of the calves evaluated, and it appears that female bison at WCNP are fertile from 1 year through at least 25 years of age. The most fertile age classes include the 2- to 9-year-olds. Sporadic successful breeding of 1-year-old bison has been previously reported to the authors by private bison managers, however, this is the first report to our knowledge of an estimated rate of maternity for 1-year-old females (approximately 4%). Our analyses also revealed patterns of female breeding success over time, with approximately 18% (41/220) of the dams producing 6 or more calves during the 10 year study period.



Photo 22. Bison calf few weeks old

- 4) While slightly changing the culling strategy of WCNP from targeting 1-year-olds to 2-year olds will likely improve overall maintenance of genetic diversity, the genetic diversity of this important bison population would be better protected by the maintenance of a metapopulation across several sites since the risk of catastrophic loss would be substantially decreased.

Bison Miscellaneous:

- Sent (to Mexico) information on disease tests conducted on the bison that went to Mexico.
- Attended NPS bison meeting at Mount Rushmore NM
- Attended the Wildlife Conservation Society and American Bison Society meeting in Tulsa Oklahoma. Demonstrated the bison computer program for several TNC folks.

- Provided information (questionnaire) on Wind Cave bison and possibility of sending bison to Montana, to Montana Fish, Wildlife and Parks biologist Arnold Dood.
- Provided information and documents to TNC on the steps and forms needed to transfer bison to Mexico.
- Involved in discussions with The Nature Conservancy in SD, Iowa and Kansas (TAPR), Mexico regarding availability of bison over the next few years.
- Updated brucellosis history (sent to Montana Fish, game and Parks)

Bison Computer Program:

- Discussion with Eddie Childers and Chuck Weichler in regards to updating the computer program to make it compatible with Windows 7, as well as make it more versatile for others to use the program – work continues.
- Working with IT to document program instructions for training purposes.
- Demonstrated the Bison Program at the WCS mtg. in Tulsa.
- Provided training on the bison program for several of The Nature Conservancy personnel from Broken Kettle (Iowa) and Dunn Ranch (Missouri). Assisted with technical support on bison program and equipment needs for their bison capture operations.

Bison Mortalities Documented in 2011

No formal bison mortality study was conducted in CY 2011 but all bison mortalities turned in to Resource Management were documented. Bison mortalities average ~ 25 per year.

- 1) January 4, 2011 – 12 year old bison cow found off NPS 6 (½ mile north of junction of NPS 5/6) on east side of road (UTM 630530/4826961). Unknown cause of death, scavenged, golden eagle and magpie at carcass. Eartag ACZ 7442. Had been in capture operation twice. Probably dead 2-3 days. **Photo 23.**



Photo 23. Twelve year old cow off NPS 6

- 2) January 25, 2011 – 12 year old bison cow (eartag JAE 9105) found in draw north of Boland trail (UTM 630758/4827986). Unknown cause of death. In very good condition. Appeared to have “dropped over” dead. No sign of struggle or injury? gunshot? Was not pregnant but did have ~ 18 placental scars.

- 3) January 27, 2011 – Bison calf (probably male due to horn size) found dead to east of the SE prairie dog colony in drainage (UTM 630349/4825545). Completely scavenged. Estimated time of death ~ January 2, 2011. Unknown cause of death. **Photo 24.**



Photo 24. Bison calf completely scavenged

- 4) April 5, 2011 – Bison bull found dead SW of Red Valley prairie dog town; skull had been removed. 630091/4828717. Died recently of unknown causes

- 5) April 26, 2011 – Bison cow found in Prairie Dog Canyon (UTM 0623263/4825481) Eartag IKT 8692. This cow was 21 years old and had not been in a capture operation since 1999. **Photo 25.**



Photo 25. Twenty-one year old bison cow

- 6) June 5, 2011 – Bison bull died near the bison jump. UTM 625886/4831811 (later carcass moved). No eartag or implant. Age estimated at ~ 13 years old. Unknown cause of death. Still had winter coat. **Photo 26.**



Photo 26. Bison bull near bison jump

- 7) June 6, 2011 – Found bison bull dead in mud hole west, SW of cottonwood enclosure. May have died after becoming stuck in the mud. This area is known to have animals become mired in the mud. (general location 630066/4829214) **Photo 27.**



Photo 27. Bison bull died in mud hole

- 8) July 27, 2011 – Eight year old bison cow found dead near the Beaver Creek sink hole. Unknown cause of death, though she still had part of her winter coat so not in good health. Eartag JAE 9123. UTM 13/624296/4826859. **Photo 28.**



Photo 28. Eight year old bison cow found dead near the Beaver Creek sinkhole

- 9) July 31, 2011 – MVA on 385 near Prairie Restoration pullout. Bison calf (unknown sex)

- 10) September 10, 2011 – 17 year old bison cow found dead in Hidden Valley. This cow was brought in as a calf in 1994 when implants were first being used. She has been captured a total of 5 times in the last 17 years. Eartag IUS 6619, UTM 13/0624780/4831672

- 11) September 21, 2011 – Yearling bull found dead along Centennial trail (Beaver Creek) upstream from “sink”. May have been one of the bison that was hit by a vehicle a month ago. Head collected for Interp. UTM 13/0624117/4826848

- 12) October 7, 2011 – 14 year old bison bull found dead in drainage near Air Quality station. Last in capture operation in 2000. Implant AVID* 001*823*770. UTM 13/0622314/4823836. Probably dead ~ 1 week. **Photo 29.**



Photo 29. 14 year old bison bull near Air Quality Station

- 13) November 17, 2011 – 25 year old bison cow found dead near Windy Point area UTM 13/620868/4823021. Eartag ITC 3175. Probable cause of death – old age.
- 14) February 15, 2012 - Young bull or cow found dead (dead ~ 6 months),UTM 13/621215/4820070
- 15) February 16, 2012 - 25 year old bison cow (dead ~ 6 months), Eartag ITC 3175, UTM 13/620868/4823021. Probable cause of death – old age.

ELK REPORTS:

USGS / Wind Cave National Park Elk Project (2011)

A new 3 year study, “*Evaluate Elk Population Control and Support Adaptive Management at Wind Cave National Park*” was begun in 2011. This project is a continued collaborative effort between Dr. Glen Sargeant with the USGS in Jamestown, North Dakota and the NPS.

2011 Summary Report:

To document the effects of the preferred alternative established within the Environmental Impact Statement/Elk Management Plan (Record of Decisions-12/3/09) and provide information needed for evaluation and adaptive management by comparing elk movements, the following was completed in year 1 of 3:

Thirty five GPS radio collars were refurbished, an elk capture (cows only) was completed on February 18-19, 2011 with the use of a helicopter capture crew from Clarkston, Washington, and an Inter-Agency Acquisition Agreement (IAA) was put in place with USGS. Since the capture, monitoring of the elk with GPS radio collars has taken place on a weekly basis.

Elk gates were put in the upright position during the capture to avoid un-intentional hazing of elk out of the park. By February 28th all elk gates were lowered down to the 4-5’ level.

Blood was drawn from 35 elk. Serum used to test for pregnancy. Results from 2011 capture showed that 30 of 35 cow elk were pregnant.

Funds (\$83,160) expended in FY 2011: \$27,210 (re-furbish 35 gps radio collars), \$35,002 (capture 35 elk), \$17,416 (IAA with USGS for statistical analysis and professional expertise), and miscellaneous supplies and materials needed for the capture and monitoring efforts.



2nd Elk Capture was accomplished in February 2012. Results will be given during next reporting period.

Photo 30. Duane Weber (NPS-in green) and Dr. Glen Sargeant (USGS-in brown) packing nets in preparation for netting gunning operation to capture elk in the park. February 2011.

Elk Jump Gates:

Phase 2 of the West Boundary Fence rebuild and installation of elk jump gates continued during this second field season for the project. The “in-house” fence crew rebuilt over five miles of 7’ high woven wire fence working on the section of the West boundary starting at the West entrance of US Highway 385 and working North to our combined border with Custer State Park.

As part of the implementation of the Wind Cave Elk Plan 8 elk jump gates were installed as part of this reconstruction. With the installation of these 8 gates plus last years’ 8 gates our total number of elk jump gates along the entire Western boundary is now 16.



Photo 31. Double wide Elk Jump Gate in the down position. Located on the West boundary fence.

Installation of elk jump gates will continue for the 2012 field season. The Park plans to coordinate with Custer State Park for the installation of 6 additional jump gates to facilitate elk to move North and potentially help boost the struggling Custer State Park elk numbers. Five of six gates are targeted to help reduce the Boland Ridge sub herd population. This will be critically important as the elk in the Boland area rarely leave the Northeast corner of the park. All previous elk jump gate installations along the Western boundary will have almost no effect on the Boland population of elk. The planned gates will provide some of the Boland population an egress out of the park.

Elk Fence - Trail Year in 2011:

The first real test of the elk jump gates and the west boundary fence installation began with the closing of all the jump gates the last week of June. This closing date coincides with our past history of when the highest numbers of elk are out of the park.

For this first year of testing the park allowed the elk to move out on their own taking advantage of their natural movement into and out of the park. It was estimated a maximum of 100 elk were out of the park at the time of closing. This included 3 radio collared elk, two of which remained out through the winter of 2011-12. One was harvested during the firearm elk season in October.

The gates remained closed from June through the late cow elk season in early-mid December. Once the gates were open in late December the elk were able to continue with their seasonal movements in and out of the park. We did not find any evidence of elk that had been closed out of the park, re-gaining access back into the park, despite some challenges to the fence by elk closed out of the park.



Photo 32. The closed gate even keeps two rutting bulls apart (Elk Mountain Elk Jump Gate).

Trail Camera Surveillance of Elk Jump Gates

Four elk jump gates were selected for the installation of Reconyx HC600 Hyperfire HD covert IR trail cameras. The cameras run on 12 “AA” rechargeable batteries, and were outfitted with a 4G SD memory card capable of storing 10,000 photos.

Battery life was around three weeks when the weather would dip to near or below zero. In warmer weather, batteries last well over 8 weeks even when taking numerous photos. We have been checking the cameras every 3-4 weeks to trade out memory cards and batteries. Some cameras have taken up to 2500 photos between each visit. The photos are of good enough quality that the park interpretation staff can use them for displays, publications, and presentations.

The trail cameras are being used in conjunction with the radio collared elk tracking to determine location, timing and movements of elk in and out of the park. We were able to confirm that when the gates are open they offer a usable route of egress in and out of the park for both deer and elk, but still keep our bison within the park. Equally as important, the cameras helped confirm that when the gates are shut any elk closed out of the park remain out of the park.



Photo 33. A young cow elk shows how it's done, with more to follow.

The cameras were also instrumental in documenting the first modern day occurrence of Bighorn sheep in the park. An adult ram was photographed Nov 27, 2011 as he cruised the West boundary during what would be their rut period. We assume he came from Custer State Park to our North.

Mountain Lion Study with SD Game Fish and Parks:

We were approached by the SD Game Fish and Parks with a proposal to re-collar an adult male Mt. Lion that was known to hunt Wind Cave with an active sync downloading GPS collar that would send locations to the GF&P office. Any collar locations with three or more points in close proximity to each other are classed as a “cluster”. The clusters of activity are then investigated to determine the lions’ activity at those points. Often the cluster leads to a kill where the prey species and condition of the prey animal are determined. The park felt this would be a good

opportunity to learn what prey species the lions were feeding on in the park and local area as well as possibly provide another level of surveillance for CWD if they were to prey on deer and/or elk. Clusters from two collared lions started arriving the first week of December. In addition to the adult male, another already collared adult female was also regularly hunting the park.



Photo. 34. Duane Weber gathers data at a Mt. Lion kill site using the Juno GPS unit. The victim was a young White-tailed deer killed by female F250.

Documented prey animals so far have been White-tailed deer, Mule deer, turkey, young elk and cow elk for the female lion. The male seems to have a preference for elk as he regularly kills even prime age adult bulls. He has also killed and eaten a coyote.

CWD Testing in 2010-2011 (within Wind Cave NP)



Photo 35.

Duane Weber carrying elk head out of the backcountry for CWD testing as well as removing elk head and antlers to keep from being stolen by antler poachers.

Test results include elk, mule deer and white-tailed deer (January 2010 - December 2011)

January to December 2010

20 Cervids were tested for CWD (6 Positive and 14 Negative)

Elk

17 total tested (5 positive and 12 negative) 7 of these elk were Mt lion kills, 2 of which were positive.

11 males (5 Positive and 6 negative)

6 females (0 positive and 6 negative)

Mule Deer

3 total tested (1 positive and 2 negative)

All were female and killed by motor vehicles

January to December 2011

21 Cervids were tested for CWD (6 Positive and 15 Negative)

Elk

17 total tested (6 positive and 11 negative) 8 of these elk were Mt lion kills, 4 of which were positive.

10 males (4 Positive and 6 negative)

7 females (2 positive and 5 negative)

Mule Deer

1 total tested (0 positive and 1 negative)

Female killed by motor vehicle

White-tailed Deer

3 total tested (0 positive and 3 negative)

1 female and 2 males killed by motor vehicles

Park Totals from CWD Testing- March 1998 – December 2011

Since March 1998 when CWD testing was initiated to December 2011, the Park has tested 265 cervids for CWD (41 Positive and 224 Negative). Approximately 28 of these cervids were Mt Lion Kills, 9 of which were CWD Positive.

The reader should keep in mind that this type of surveillance “targeted” towards sick looking, lion kills, road kills, etc. cannot be accurately compared to other populations that are being harvested through hunting. Prevalence rates are also difficult to determine from this data since it is so targeted and not randomly acquired from a huntable population.

Elk 111 (32 Positive and 79 Negative)

Mule Deer 117 (8 Positive and 109 Negative)

White-tailed Deer 37 (1 Positive and 36 Negative)

Elk Calf/Cow Counts

Elk population counts conducted and calf/cow ratios calculated.

Calculated average in 2011 was 30-35 calves per 100 cows within the park.

Elk in the Gobbler area of the park show a ratio of 32 calves/100 cows while the Beaver/Rankin area of the park was similar with counts averaging 30-35 calves/100 cows. The Boland Ridge area was notably higher than the past few years with counts almost identical to the rest of the park at 30-35 calves/100 cows.



Photo 36. Elk calf – few weeks old



Photo 37. Monitoring elk herd for calf/cow counts

Summer of 2011 elk population was approximately 700 animals. The winter ground estimate December 2011-February 2012 was 850-900+ animals. These are best estimates only (# derived from ground counts, not aerial surveys).

PRONGHORN REPORT:

Survey Results from 2010 and 2011

2010: Pronghorn Survey conducted on September 16, 2010. Thirteen observers involved with the survey.

Total estimate of pronghorn = 125-130 (an increase of 5-10 animals compared to last survey in 2007)



2011: Pronghorn Survey conducted on September 20, 2011

With the assistance of 11 Staff and volunteers the units within the park were surveyed for pronghorn adults and kids. **An estimated 85-90 pronghorn were determined to be in the park.**

Photo 38. Two adult female Pronghorn with a Pronghorn kid in background

As has been the case over the past few years, there were very few kids that survived from June (when most of the pronghorn kids are born) until the September survey. This survey did detect 3 kids that had made it through the critical time period of their first 3 months. 2010 survey yielded 3 kids as well. In 2011, there were numerous reports of pronghorn kids observed throughout the park (app. 2 dozen) but as mentioned above, very few made it through the summer. **Photo 39.** Twin Pronghorn kids just a few weeks old

The sharp decrease in kids over a 2-3 month period is most likely coyotes hunting them as well as Golden Eagles and possibly weather related factors.



Pronghorn numbers in the park have varied from as few as 24 in 2001 to 350 in 1963.

PRAIRIE DOG REPORTS:

Flea / Plague Study

Sylvatic plague is a non-native disease caused by the bacteria *Yersinia pestis* that has devastating impacts on prairie dog ecosystems. It can also infect and be fatal to humans therefore is considered a major health concern. Though active plague has not been found in the Park, it has been found within 20 miles of the border. Wind Cave National Park is currently involved in a research project to study *Yersinia pestis* prevalence and its flea vectors on black-tailed prairie dog (BTPD) colonies in five National Parks. As part of this effort, 1393 burrow-swabbed fleas have been collected in nine prairie dog colonies within the Park since 2009. Though analysis has not been completed on all fleas collected in 2011, to date flea researchers have found the presence of the *y. pestis* gene in some fleas within 7 prairie dog colonies within the Park.



Photo 40. and Photo 41. Black-footed ferrets and prairie dogs are highly susceptible to plague

“Dusting” Effort for flea control

Information gathered from the flea research indicates the presence of an extremely virulent exotic pathogen within at least seven of the Park’s prairie dog colonies. Though no active plague (epizootic) has been observed in the Park, several recent publications (Pauli et al. 2006, Hanson et al. 2007, Eisen and Gage 2009, and Biggins et al. 2010) conclude that *Yersinia pestis* is able to exist on black-tailed prairie dog colonies in an “enzootic” (continuous, low level) state.

Understanding the ecological importance of prairie dogs, the Park decided to be pro-active and apply the insecticide Deltamethrin (DeltaDust) to as many burrows as time and budget allowed starting in 2008. Since then, other resource projects have been placed on hold and as many resources (staff, time, equipment, insecticide) as possible have been pulled together to battle this threat. Unfortunately park staff has still only been able to protect approximately 1/3 of the Park’s

active prairie dog colonies. Now the remaining prairie dog colonies remain unprotected from a potentially devastating plague outbreak. In Conata Basin/Badlands National Park, it has been found that while dusting with the insecticide Deltamethrin does appear to protect prairie dogs from plague, the efficacy is reduced after 10-12 months. In areas with active plague, such as Badlands National Park, only areas that have been dusted remain active. There is no way of knowing when the right conditions may present themselves for a severe outbreak to occur at Wind Cave. Once active plague has been detected, it is too late. The Park must be proactive to protect visitors and the many species of wildlife that the visitors come to view and photograph, that are depending on this treatment effort to avoid a plague outbreak in Wind Cave Nat'l Park.



Photo 42.

Biological
Science
Technician
Duane Weber
prepared for a
day of dusting
prairie dog
burrows

From 2008-2010, Park staff used ATV's for dusting and had one person flag transects to make sure most burrows were dusted. In 2011, staff experimented with walking in place of ATV use, using minimal flagging. This method proved quite effective. See yearly comparison in Table 9.

Year	Acres Dusted	Total Burrows	Person Hours	Burrow/Hour	Cost	Cost per Acre
2008	1,100	60,505	1,235	57	\$53,631.06	\$48.76
2009	725	33,298	443	75	\$19,195.85	\$26.48
2010	900	37,777	825	46	\$25,246.57	\$28.05
2011	1,198	58,640	476.5	123	\$26,542.21	\$22.16

Table 9. Comparison table – acres, burrows dusted, hours, cost, etc.



Photo 43. NPS employees Duane Weber (foreground) and Kelly Mathis applying DeltaDust insecticide into prairie dog burrows on Bison Flats. This insecticide will kill the fleas living in the prairie dog burrows as well as the fleas living on the prairie dogs themselves. Fleas are the insect that carries the plague bacteria and can transmit the disease to prairie dogs as well as Black-footed ferrets. Plague is fatal to both ferrets and prairie dogs (the main food source for the endangered Black-footed ferret) since neither species has built up any resistance to this non-native disease.

Prairie Dog Colony Status Report:

Historically (since 1934) the Park has completed sporadic measurement of prairie dog acres using various methods such as aerial photo interpretation, remote sensing and ground surveys. In 1999, the Park started using GPS technology to map prairie dog acres and have attempted to complete GPS mapping of all colonies every two years since. This started to be more challenging in 2008 for a variety of reasons, such as the increase of horehound and precipitation which both lead to a fragmentation of the colonies. Figure 2 shows how prairie dog acreages increased from 1995 to 2008 and have started to decrease since 2008.

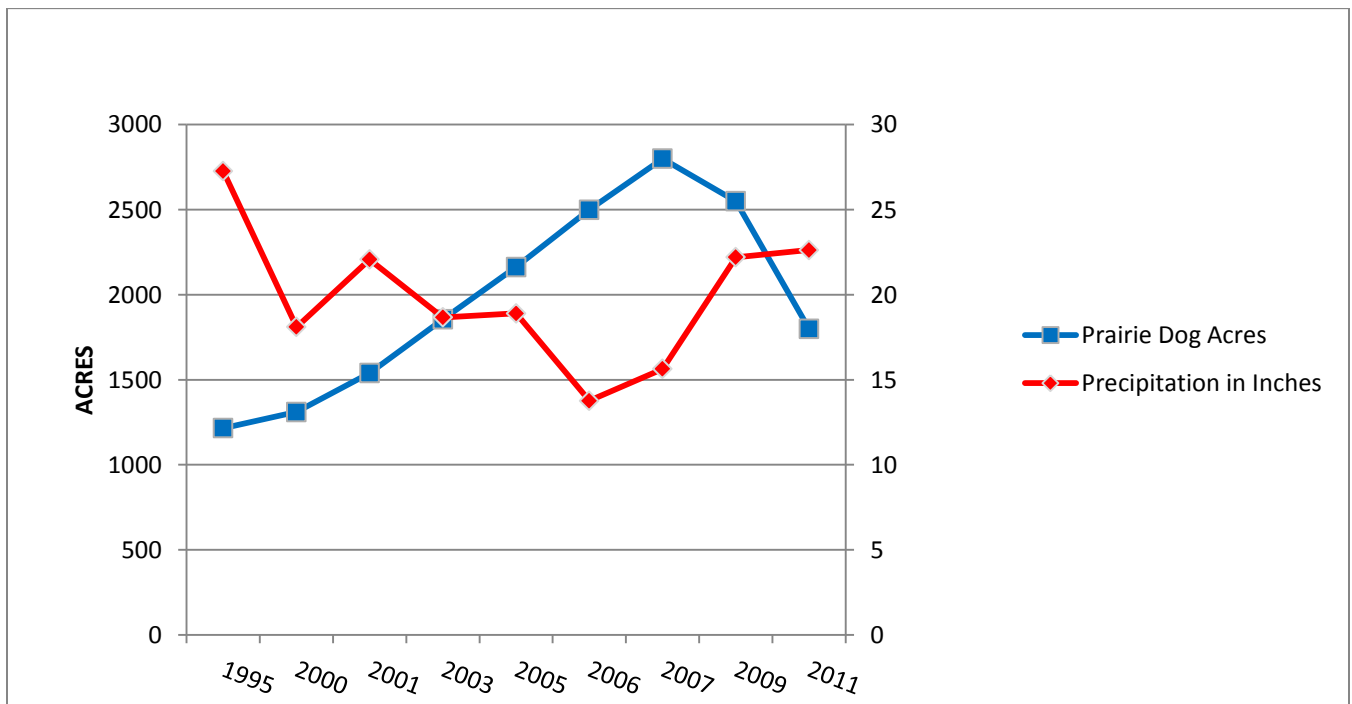
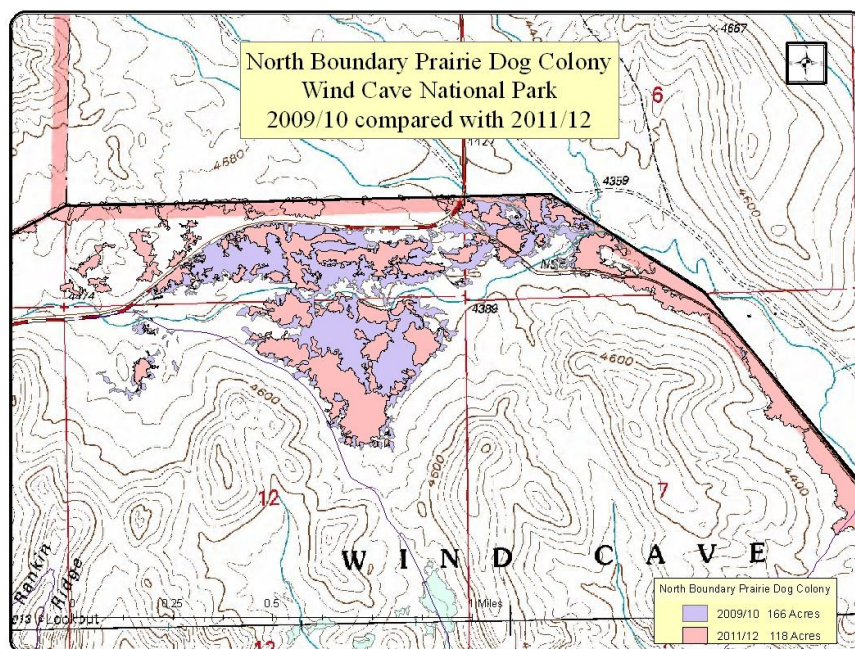


Figure 2. Prairie Dog acres/Precipitation Correlation from 1995 - 2011

As was mentioned above, part of this fluctuation is due to changes in precipitation. Prairie dogs do not like to be in tall vegetation and are known to clip the vegetation to allow maximum viewing for possible predators. Clipping vegetation expends a lot of energy, so prairie dogs will first move into preferred areas that have shorter vegetation; such as areas already “clipped” by foraging bison or other ungulates, or into areas that have less vegetation due to low precipitation. During 2002-2007, the Park experienced five years of below average precipitation (using the “Water Forage Year”, measured from October-September), resulting in shorter and less vegetation. This allowed the prairie dogs to expand more easily. Since 2008, the Park has received above average precipitation resulting in an increase in amount and height of vegetation. The prairie dogs have not been able to keep up with this increase in vegetation resulting in a contraction and fragmentation of many prairie dog colonies. Figure 2 shows the correlation of increased precipitation with the decrease in prairie dog acres. The prairie dog acreages are high during the low precipitation years and low during high precipitation years.

Horehound is another factor that has most likely caused a decrease in prairie dog acreage. Horehound is a non-native of the mint family, is unpalatable and difficult for the prairie dogs to keep clipped. Prairie dogs have completely moved out of unclipped horehound areas. Horehound has also contributed to the fragmentation of the colonies as well as decreasing the ability of prairie dogs to see predators resulting in a possible increase in predation. It is currently estimated that the Park has approximately 1000 acres of horehound.

In 2011 the Park estimated the prairie dog acreage at ~ 1800 acres. This estimate may end up being on the high side. Hopefully by the end of 2012, the Park will have a better idea of current prairie dog acreage. GPS mapping is taking a bit more time due to the fragmented active



areas. Figure 3 gives an idea of the fragmentation and shows the changes in the North Boundary prairie dog colony from 2009/10 (purple area 166 acres) to 2011/12 (pink area 118 acres).

Figure 3. North Boundary Colony 2009/10 compared with 2011/12 GPS mapping

BLACK-FOOTED FERRET REPORTS:

Black-footed Ferret Reintroduction Effort:

The Black-footed Ferret reintroduction effort began on July 4, 2007 with the release of 7 ferrets that were brought over from the Conata Basin located on the Buffalo Gap National Grasslands. From July through November, a total of 49 ferrets were released in the park in 2007. There were also 12 ferrets released on the eastern side of the park in November 2010.

Monitoring Efforts for Black-footed Ferrets in 2011

1) **Snow tracking** took place on four separate dates covering portions of 5 colonies. We did little



snow tracking on colonies with known BFF's but concentrated on colonies we had been unable to spotlight sufficiently, especially the two colonies where the 12 kits were released in November 2010. A total of 5 individual sets of BFF tracks were observed in 3 of the colonies. A total of 17 person hours were spent on snow tracking between January 12 and April 19, 2011. The snow received over the winter allowed for fair snow tracking.

Photo 44. Black-footed Ferret tracks leading from prairie dog burrow to prairie dog burrow.

2) **Spring spotlight surveys** were minimal in 2011 with 3 people participating on 4/11/ 2011 and 4/28/2011. A total of 51 hours (29 vehicle/22 foot) were spent spot lighting the 2 colonies where we released the 12 kits in November 2010. Four ferrets were observed during this time period, with three females identified. Two other ferrets (unidentified) were observed during the spring on two colonies with known BFF's. This year's snow tracking and spring survey efforts were not extensive enough to estimate the minimum number of ferrets going into the breeding season.

3) **Fall spotlight surveys** took place from 9/12 - 15/2011 and 10/11-14/2011 for a total of 6 nights. A total of 607.5 person hours (409 by vehicle/198.5 by foot) were spent by 30 participants (many were inexperienced and available for only 1 night). An additional 60 hours were contributed by NPS veterinarians. During this 6 night period, 23 ferrets were captured: 6 kits (2:4) and 17 adults (7:10), with 23-36 other individual sightings (unable to trap). We are looking into the possibility that some of the ferrets captured in September and aged as adults, may actually have been kits. This brought our post fall survey BFF population estimate to a minimum of 46-59 BFF's (not counting spring survey). Three of the ferrets identified during the spring survey were not recaptured during the fall surveys. A female released in the Red Valley colony was captured near the NPS 5 prairie dog colony.

Fall spotlight surveys (September and October) is when we capture and microchip the kits that were born earlier in the year. If it is an adult that does not have a microchip, indicating that it had not been captured before, then the veterinarian will go ahead and insert a microchip between its shoulder blades. All ferrets in the wild are suppose to have a unique identifier for tracking purposes as well as providing a history of that animal.



Photo 45. Ferret trapped, ready to be transported to anesthesia trailer for exam and micro-chip ID



Photo 46. Once anesthesia wears off the ferret is returned to the same prairie dog burrow that it had been trapped.

4) Combining all 2011 surveys, the Park's population is **estimated at a minimum of 46-64 Black-footed ferrets.**



a. Total hours spent during 2011 surveys = 675.5 person hours (438 vehicle/237.5 foot)

b. Minimum number of BFF's believed to be in the Park = 46-64 BFF's (26 of these were identified during the year, 20-38 unable to capture/identify).

Photo 47. Close up of Black-footed Ferret

List of all Ferrets Identified in 2011

Date	Sex	Ferret ID	* Age	Implant #	Colony	UTM (NAD 83) 13
10/12/2011	M	10-006	Adult	082*378*051	North Boundary	625147/4832602
10/12/2011	F	09-006	Adult	037*567*117	North boundary	623485/4832787
10/13/2011	F	10-009	Adult	037*563*269	North Boundary	624363 / 4833214
10/12/2011	F	10-011	Adult	037*596*887	North Boundary	624217 / 4834000
9/13/2011	F	09-011	Adult	037*065*014	North Boundary	624324 / 4833358
4/28/2011	F	SB#6677	Adult	041*029*531	Southeast	630006 / 4825933
4/29/2011	F	SB#6793	Adult	041*038*363	Southeast	629897 / 4826176
4/29/2011	F	SB#6792	Adult	041*005*074	Southeast	630091 / 4825796
10/11/2011	F	SB#6788	Adult	041*031-834	Red Valley	626542 / 4831957
9/12/2011	F	11-001	2011	082*297*531	Bison Flats	623276 / 4823087
9/12/2011	F	10-013	*Adult	082*375*071	Corrals	625932 / 4831924
9/12/2011	M	10-014	*Adult	082*375*517	North Boundary	625933 / 4831922
9/12/2011	M	10-015	*Adult	082*513*067	North Boundary	624098 / 4833990
9/12/2011	M	10-016	*Adult	025*024*071	North Boundary	624130 / 4833826
10/12/2011	F	11-002	2011	082*513*126	Bison Flats	622805 / 4822232
9/13/2011	M	10-017	*Adult	082*519*550	Bison Flats	623080 / 4822805
9/13/2011	F	10-018	*Adult	082*383*368	North Boundary	625530 / 4832225
9/13/2011	M	10-019	*Adult	082*287*576	Bison Flats	622846 / 4822972
9/13/2011	F	10-020	*Adult	082*382*635	North Boundary	624131 / 4834029
10/13/2011	F	10-021	*Adult	082*524*067	North Boundary	624294 / 4833204
9/14/2011	F	10-022	*Adult	082*521*259	North Boundary	625093 / 4832947
10/11/2011	M	11-004	2011	082*382*121	Bison Flats	622937 / 4822883
10/11/2011	F	11-003	2011	082*348*266	NPS 5	627127 / 4831468
10/12/2011	M	11_005	2011	082*383*108	North Boundary	623655 / 4832814
10/13/2011	M	10-023	Adult	082*382*016	North Boundary	625628 / 4832053
10/13/2011	F	11-006	2011	082*347*348	North Boundary	625726 / 4831840

Table 10. All ferrets observed during 2011 calendar year - Spring and Fall surveys

Environmental Education / Outreach Programs Dealing with B.F. Ferrets:

The Park conducted 10 Prairie Night Hikes throughout the summer, with a total of 188 people attending. These are Ranger led hikes that allow visitors to experience the sights and sounds of the prairie at night, with hopes of seeing a ferret.

The Interpretive Division Discovery Program on black-footed ferrets was presented 14 times over the summer months to 490 visitors.

Two additional Discovery programs were devoted to the Prairie, including ferrets. 19 of these programs were given reaching 665 visitors.

The Park also conducted daytime prairie hikes and a nighttime campfire program devoted to the prairie and ferrets. An additional 147 visitors attended these programs.

The Interpretive Division reached 1147 people during their spring Environmental Education Program. Black-footed ferrets are an important component of this program.

Ferrets were featured in an article in the Park's newspaper. (37,000 copies printed).

The Park reached approximately 37,000 – 38,000 people regarding ferrets during 2011.

BATS:

White-nose Syndrome (WNS)

News Release from the U.S Fish and Wildlife Service, Office of Communications
January 17, 2012

North American bat death toll exceeds 5.5 million from white-nose syndrome

On the verge of another season of winter hibernating bat surveys, U.S. Fish and Wildlife Service biologists and partners estimate that at least 5.7 million to 6.7 million bats have now died from white-nose syndrome. Biologists expect the disease to continue to spread.

White-nose syndrome (WNS) is decimating bat populations across eastern North America, with mortality rates reaching up to 100 percent at many sites. First documented in New York in 2006, the disease has spread quickly into 16 states and four Canadian provinces. Bats with WNS exhibit unusual behavior during cold winter months, including flying outside during the day and clustering near the entrances of caves and mines where they hibernate. Bats have been found sick and dying in unprecedented numbers near these hibernacula.

“This startling new information illustrates the severity of the threat that white-nose syndrome poses for bats, as well as the scope of the problem facing our nation. Bats provide tremendous value to the U.S. economy as natural pest control for American farms and forests every year, while playing an essential role in helping to control insects that can spread disease to people,” said Fish and Wildlife Service Director Dan Ashe. “We are working closely with our partners to understand the spread of this deadly disease and minimize its impacts to affected bat species.”

*An updated map of WNS occurrences was just completed (4/27/12) by Cal Butchkoski, Pa Game Commission. The disease has been confirmed as far west as Missouri with a suspected case as far west as Oklahoma.

What is Wind Cave NP doing about this deadly fungus that is attacking bats? The Park has developed a White-nose Syndrome Response Plan as well as conducted a winter hibernacula survey for bats. See below for details.

White-Nose Syndrome Response Plan-Wind Cave National Park

Introduction

Since 2006 White-Nose Syndrome (WNS), a fungal disease has killed hundreds of thousands of cave-dwelling bats in the U.S. First found in caves/mines in New York, it has spread south and west. As of spring 2010 it was discovered as far west as Oklahoma. Little is known about the disease; transmission appears likely to be bat-to-bat, and some evidence may indicate that the spread of WNS may be linked to human traffic from cave-to-cave. This disease poses a considerable threat to cave-roosting bats throughout North America. As WNS spreads, the

challenges for managing the disease continue to increase. The plan outlined below details the elements critical to the investigation and management of WNS and protection/use of related park resources. This plan is intended to be dynamic so that it may change as new information becomes available. Actions will be based on the best available science.

Background

There are over 40 caves within the park; with Wind Cave being the longest at over 134 miles. Wind Cave, the fourth longest in the world, has four entrances, including an elevator and a human-made entrance currently with a revolving door. Guided cave tours travel through approximately 2.5 miles of Wind Cave on five different tour routes. All park caves are closed to human access, except via ranger-led tours or by permit. The park hosts eleven species of bats, eight of which are cave-dwelling (Foster 2004). Bats have been documented in seven caves within the park including Wind Cave (Ohms 2002). The bats seen in Wind Cave generally are only found in the immediate vicinity of the Natural Entrance.

For copies of the complete Wind Cave NP White-Nose Syndrome Response Plan contact Rod Horrocks or Marc Ohms in the resource management office.

Bat Hibernacula Survey - 2011.- Wind Cave National Park:

Survey Report prepared by Joel Tigner, Batworks, LLC Rapid City, SD
Coordinated with Marc Ohms (Physical Science Technician, Wind Cave NP)

Bat Hibernacula Surveys – Wind Cave & Coyote Cave February 8-9, 2011

Bat hibernacula surveys were conducted at two sites on Wind Cave National Park in Custer County, South Dakota. These surveys were conducted utilizing visual observance and (where possible) identification of bats in areas that had demonstrated bat use in previous winter observations. Efforts were made to minimize disturbance in areas where bats were observed. No bats were handled and only bats displaying reliable, unique identifying characteristics were identified to species.

WIND CAVE – 02/08/11

(Temp. at start of survey 7°F [-14°C] and finish 13°F [-11°C]; winds: calm throughout; RH: 27%)

A survey was conducted between the walk-in entrance of the cave and the area termed the Post Office. Side passages were entered and searched but characteristics of the rock's surface features provided numerous locations where bats could be located and were unobserved. Three bats were observed during the survey, all tucked into crevices. All were in close proximity to the Post Office section of the cave and located within the main passage. Two species were identified: a single *Myotis ciliolabrum* (Western Small-footed Myotis) and a single *Myotis septentrionalis*

(Northern Myotis). The third bat was located in a position that blocked the view of the tragus although ear length suggested this was also *M. septentrionalis*. While certainly of the genus *Myotis*, identification to species could not be made. (Species that were eliminated included *M. ciliolabrum* and *Perimyotis subflavus* [Tri-colored Bat]).¹ Additionally, *Myotis thysanodes* (Fringed Myotis) and *Myotis evotis* (Western Long-eared Myotis) were also eliminated from consideration (based upon overall size, ear length, ear/mask color). *Myotis lucifugus* (Little Brown Myotis) and *Myotis volans* (Long-legged Myotis) are morphologically similar and could not be excluded.

¹ Formerly *Pipistrellus subflavus*. See Geluso K., Mollhagen T.R., Tigner J.M., and Bogan M.A. 2005 Westward expansion of the eastern pipistrelle (*Pipistrellus subflavus*) in the United States, including new records from New Mexico, South Dakota, and Texas Western North American Naturalist 65(3):405-409

An exhaustive survey of this location would be difficult, if even possible, and would require prolonged and unacceptable search times. (Such searches would result in high levels of disturbance through increased temperature and associated noise.) The site's common characteristic of rapid air movement related to barometric pressure changes would likely require all bats to be located in cracks or crevices to mitigate an acceptable microclimate required for hibernation.

Participating in the survey:

Marc Ohms, WCNP

Dan Roddy, WCNP

Rod Horrocks, WCNP

Lee-Grey Boze, WCNP

Joel Tigner, Batworks, LLC

COYOTE CAVE – 02/09/11

(Temp. at start of survey 12°F [-11°C] and finish 16°F [-9°C]; winds: 13-16 mph; RH:18-35%)

Located within a drainage bottom emptying into Highland Creek, this cave routinely floods during periods following significant rainfall. Evidence of flooding can be observed with organic debris filling cracks and crevices on the walls and ceilings of the cave. Two separate sections of the cave were surveyed. The cave is characterized by low ceilings and, in the section with fewest bats, sediment and organic material were still deposited on walls and ceilings.

A total of 14 bats were observed during the survey with all observed in crevices or sheltered dome-like locations. Two species were identified, *Myotis septentrionalis* (Northern Myotis) and *Myotis ciliolabrum* (Western Small-footed Myotis). All observed bats were of the genus *Myotis*. Four of the bats observed were located in the initial entry chamber (including one pair of *Myotis ciliolabrum* (Western Small-footed Myotis) and one confirmed *Myotis septentrionalis* (Northern Myotis). The other ten bats were located in the section of the cave containing the gated passage. One *Myotis ciliolabrum* (Western Small-footed Myotis) was by accidentally crushed during surveyor passage through this section of the cave. It was unknown where the bat had been roosting but may have been within loose rock on the floor of the passage. One cluster of three bats was observed in this section although species could not be determined.

The cave exhibited no evidence of any recent human visitation at the time of the survey. A photograph of the cave entry point is attached.

Management Recommendation: cave opening should be kept free of vegetation that would serve to obstruct the flyway into the cave during the winter season. Summer obstructions by annual grasses or shrubs are not of concern, as these may serve to prevent or limit bat use during the time when flooding is most likely to occur.

Participating in the survey:

Marc Ohms, WCNP

Dan Roddy, WCNP

Lee-Grey Boze, WCNP

Brad Phillips, BHNF

Joel Tigner, Batworks, LLC

Report prepared by Joel Tigner, Batworks, LLC, Rapid City, SD



Photo 48.
Coyote Cave
entrance
Photo by
Brad Phillips

HERPS:

Tiger Salamander Study at Wind Cave National Park

A Tiger Salamander Study was begun in 2009 in collaboration with Black Hills State University (BHSU) and Wind Cave National Park. BHSU is investigating the effects of the insecticide deltamethrin on non-target vertebrates. At the Bison Flats area of Wind Cave National Park, a black-tailed prairie dog town (*Cynomys ludovicianus*) is found surrounding a seasonal wetland. A large population of tiger salamanders (*Ambystoma mavortium*) occurs at this site, apparently living commensally with the prairie dogs and using the wetland as breeding habitat. This prairie dog town is being dusted with deltamethrin, a pesticide used at black-footed ferret (*Mustela nigripes*) reintroduction sites to control fleas that attack mammals and spread sylvatic plague, to which black-footed ferrets are susceptible. Due to the coexistence of amphibians, prairie dogs, and blackfooted ferrets, Bison Flats creates an ideal situation in which to study the effects of deltamethrin on non-target vertebrates. Amphibians can easily pick up environmental contaminants due to their semi-permeable skin.

2011 Results from BHSU:

Seventy-six salamanders were captured with 0 recaptures. Of these 76 individuals, 35 were captured from within the wetland and 41 from prairie dog burrows. A total of 336 salamanders eluded capture but were observed within burrows. Of these 336, 198 were observed on the south side of the highway and 138 were observed on the north side of the highway.

Photo 49. Tiger Salamander (*Ambystoma tigrinum*)



Discussion by BHSU:

Because no tiger salamanders were recaptured, we cannot do an estimate of population size. But this result and our high capture rates do reflect the fact that tiger salamanders must be very abundant at the site. Late in the season we trapped a second pond to the west of Bison Flats. From this pond we captured 15 individuals in six recovered traps. However, hundreds of salamanders were observed from shore gulping air. The lack of captures here is most likely because nine traps were

trampled and opened by wildlife. The positive correlations between person hours and number of holes searched are expected. With more people checking more holes, one would expect to find more salamanders. The slight correlation with RH seems intuitive. Salamanders thrive in moist environments; therefore one would expect more salamanders to be active during humid nights. However, the slight positive correlation with max wind speed was unexpected. A stiff constant breeze would be expected to wick the moisture from the air, causing desiccation of the permeable skin of the salamanders. This expected trend is supported by the negative relationship between average wind speed and number of salamanders observed. As average wind speed increased, fewer salamanders were observed. However, increases with max wind speed did not appear to negatively affect the number of salamanders observed. This seems to contradict the

afore mentioned hypothesis, however a constant breeze is better reflected in average wind speed measurements, with intermittent gusts portrayed by the max wind speed recordings. The slight negative correlation between percent cloud cover and number of salamanders observed seems counter-intuitive. One would expect higher activity during darker nights being that the darkness can provide additional cover for salamanders. This observed trend might result from the use of flashlights. As cloud cover increases, the amount of natural light decreases; a flashlight is used to search for burrows. The sudden illumination upon discovering a burrow provides ample time for a salamander to react to the light and retreat into the burrow long before the surveyor can reach the burrow entrance.



Photo 50. An 8" long Tiger Salamander on its way to Bison Flats Pond during the spring breeding season

NOTE: A second study is planned for 2012-2013 to look at possible secondary effects (positive and negative) of the insecticide deltamethrin on small mammals that reside in prairie dog burrows.

Other Herps (Snakes):



Photo 51. Duane Weber moving Prairie Rattlesnake from sidewalk



Pale Milksnake (*Lampropeltis triangulum multistriata*) also found at park visitor center during the summer of 2011. Milksnakes are uncommon within Wind Cave NP. They are 1 of 9 snake species found in the park.

Photo 52. Pale Milksnake

OTHER UNUSUAL WILDLIFE SIGHTINGS:

Big-horned Sheep was documented for the first time in the park on 11-26-2011



Photo 53. Bighorn Sheep on the Wind Cave National Park side of the fence



Photo 54. Adult Mountain Lion with 2 kittens walking the fence-line on 9/8/2011



Photo 55. Mountain Lion jumping boundary fence between Wind Cave NP and USFS property 9/8/2011



Photo 56. Mountain Lion on USFS side of fence on 11-20-11

PRECIPITATION REPORTS:

Wind Cave National Park staff members have been collecting precipitation data since rain gauges were first installed in 1940. Precipitation was documented on a monthly basis from 1940 to 1946, then only sporadically from 1947 to August, 1951. Since then, continuous monthly precipitation data has been recorded, giving us sixty years of information.

As would be expected in the Great Plains, the majority of our precipitation falls from April to September, with the greatest amount being received in May. Figure 4 represents the 60 year monthly precipitation averages received in the Park compared with the monthly precipitation received in 2011. The least amount of precipitation is typically received in January.

See next page for details.

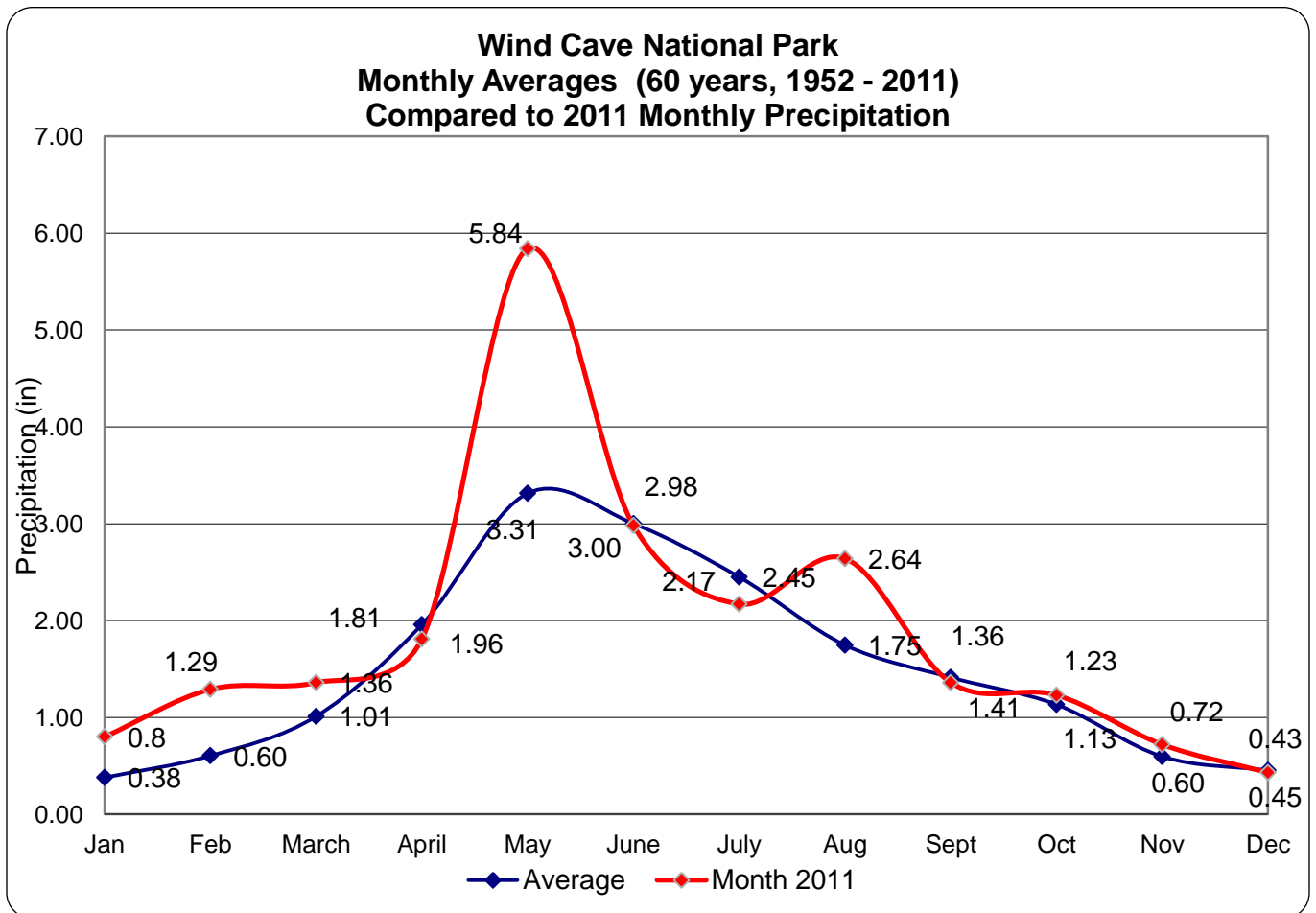


Figure 4. 60 year monthly precipitation averages compared with 2011 monthly precipitation received

As can be seen in Figure 5, Wind Cave annual precipitation can fluctuate greatly as is typical in the Great Plains. In the last 60 years, annual precipitation has ranged from a low of 10.02” in 1960, to a high of 28.87” in 1998. The Park 60 year **annual average** is **18.07 inches**. The Park received **22.63 inches** of precipitation in the **2011** calendar year.

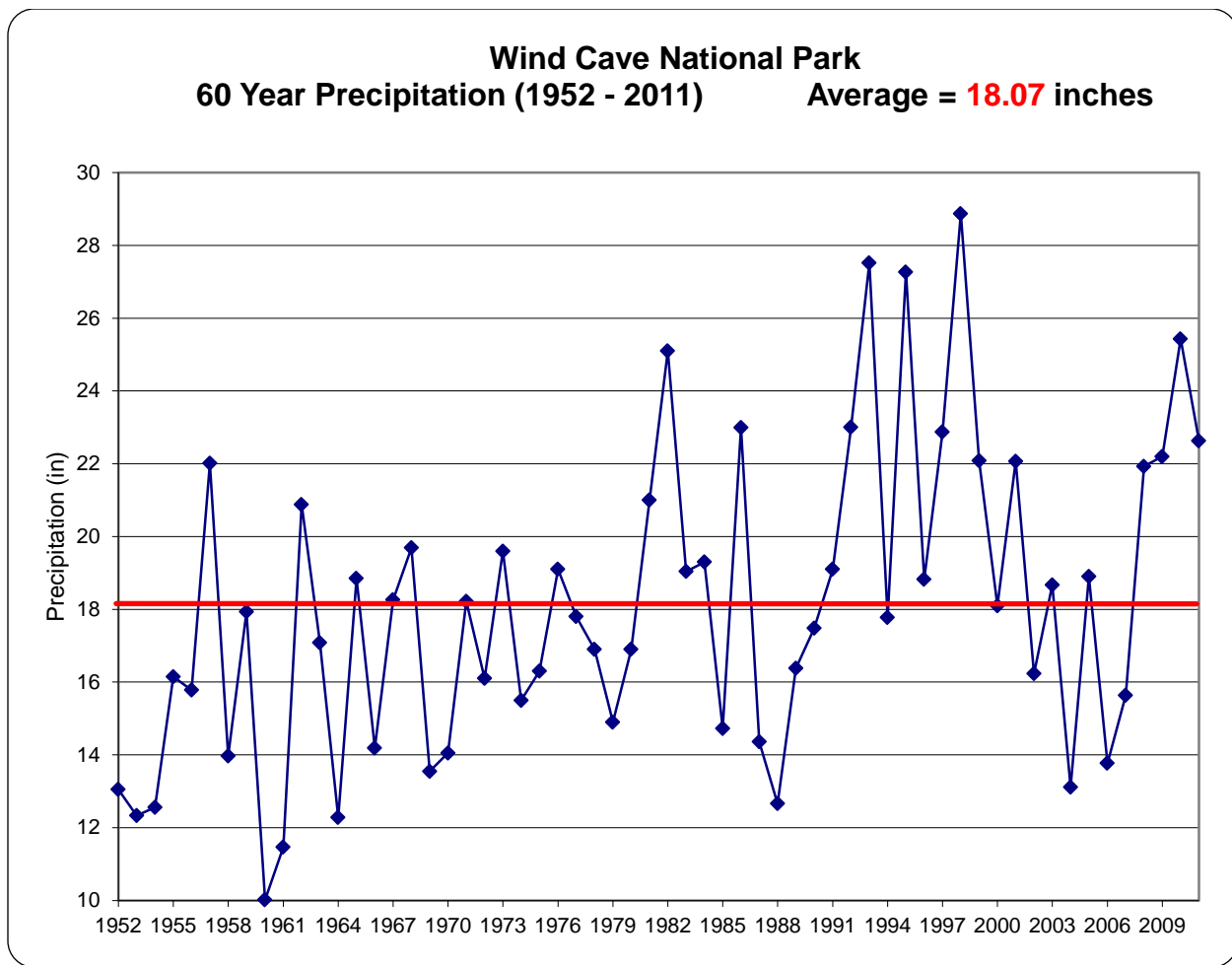


Figure 5. 1952-2011 annual precipitation (60 year average = 18.07)

This precipitation data, along with the daily high/low temperature and snowfall measurements, is the official Wind Cave weather submitted to the National Weather Service. The Park also has extensive monthly temperature data. Resource Management staff is in the process of compiling this data.

RESEARCH COORDINATOR RESPONSIBILITIES:

Completed Environmental Screening Forms as needed.

Provided information, assistance, processed applications, issued permits and provided oversight for 28 research projects in CY 2011. Eleven of these projects were wildlife related. Investigators Annual Report (IAR's) – communicated with and assisted researchers regarding IAR completion and submittal. 100% of IAR's were completed.

WILDLIFE RELATED RESEARCH PROJECTS:

Complete project proposals are on file in Resource Management Office
(Contact Barbara Muenchau Research Coordinator)

Wind Cave National Park has a long history of research being conducted in the Park and continues to encourage professional researchers and students in scientific and scholarly activity which aids the Park in making informed management decisions. The NPS recognizes the importance of research and in 2011 issued "A Call to Action – Preparing for a second Century of Stewardship and Engagement" which includes an action to sponsor excellence in science and scholarship, gain knowledge about park resources, and create the next generation of conservation scientists.

"Decision makers and planners will use the best available scientific and technical information and scholarly analysis to identify appropriate management actions for protection and use of park resources". – NPS Management Policies

The Park had 28 research projects in progress during the 2011 calendar year; 11 of which were wildlife related. Below is a brief description of the wildlife related projects.

1) [Actualistic taphonomy of cold & temperate climates: applications for Pleistocene paleontology](#) Investigator: [Lauren Milideo](#)

Purpose of Study: To examine and quantify the bone damage and bone scatter patterns resulting from mammalian and avian scavenging on large ungulate carcasses in natural environments. Actualistic taphonomic research has proven an invaluable resource for paleontologists. Through direct observation, workers have gained an in-depth understanding of diverse taphonomic processes and their effects on biases in bone assemblages (e.g. Blumenschine 1986).



2) [Comparison of bison weights across herds](#) Investigator: [Joseph Craine](#)



Purpose of Study: To compare performance metrics across US bison herds to evaluate the role of climate and grassland management in the ecology of bison.

3) [Climate Change and Avian Migration Phenology in the Great Plains](#)

Investigator: [Marcia Wilson](#)

Purpose of Study: Grassland bird species are among the most rapidly declining birds in North America and climate change is one of the major threats facing these species. Fifty five percent of the grassland species are showing significant declines. There has been mounting evidence over the past several years that the timing of migration in birds, as well as the onset of breeding, has been advancing in response to changing. Of particular concern is when the timing of breeding is no longer synchronized with the seasonal abundance of food on which successful breeding depends. Although there is substantial evidence for a general shift in migration phenology, there is considerable variation in the observed response of individual species. Research has found that on average, migratory birds arrived one day earlier for every 1° C increase in temperature.

Understanding these changes in bird migration patterns will be a critical component of understanding changes in bird populations within the Great Plains and elsewhere.

The specific objectives of this study would be:

1. Estimate the spring arrival times for migratory grassland birds of conservation concern
2. Compare the arrival times of migratory grassland birds to historic records
3. Compare the arrival times of migratory grassland birds to satellite measurements of Land Surface Temperature and plant phenology (spring green-up)
4. Evaluate the changes in migration timing with respect to regional population declines



4) [Monitoring of Great Plains grassland birds to assess habitat relationships with grazing and to inform coordinated, regional conservation management.](#)

Investigator: [Kevin Ellison](#)

Purpose of study: Researchers are measuring bird-habitat relationships mediated by bison grazing to provide grazing management recommendations aimed at conserving imperiled grassland birds.

In particular, they are focusing on how grassland birds respond to changes in the structure of mixed grass (as opposed to tall grass or short grass biomes). Working in the park is desirable as there are few other systems where large numbers of bison occur and even fewer sites where bison have occurred for long periods (several decades). This study will improve

understanding of management techniques to conserve grassland birds and these results will be applied, through outreach to grazing managers, at public and private grazing plans with bison and/or cattle. Also, as birds act as valuable indicators of ecosystem health,



management to improve their habitats will benefit other grassland species as well, e.g., prairie dogs, grouse, swift fox, etc.

5) [Evaluate Elk Population Control and Support Adaptive Management at Wind Cave National Park](#) Investigator: [Glen Sargeant](#)

Purpose of study: During summer of 2010/11, the NPS modified the boundary fence at Wind Cave National Park (WICA) by 1) increasing height from 4 to 7 feet along the southwestern boundary and 2) installing a number of 10- to 12-foot wide gates. The modifications were prescribed by a recently completed Environmental Impact Statement and Elk Management Plan with hopes of encouraging elk to exit the park in spring and discouraging returns during summer and early fall, thereby facilitating hunter harvest. Ultimately, the NPS hopes to reduce the number of elk wintering at WICA from ~800 to <475. This research will help determine the effectiveness of the gates.



6) [Monitoring the Birds of South Dakota: Wind Cave NP](#) Investigator: [David Hanni](#)

Purpose of study: Many bird species serve as indicators of habitat quality, with changes in their populations linked to changes in ecological health. Effective population monitoring identifies species at particular risk, tracks population trends over time and assesses the effects of land management decisions on breeding bird habitat. Many breeding birds in South Dakota are identified as priority species for conservation in wildlife plans. Despite the widespread use of monitoring to address these issues, there is an ongoing need to coordinate bird monitoring among organizations and integrate them across regional and international boundaries.

Rocky Mountain Bird Observatory began landbird monitoring in South Dakota grasslands in 2009. RMBO and its partners developed the Integrated Monitoring in Bird Conservation Regions (IMBCR) design to meet the following monitoring objectives:

- Integrate existing bird monitoring efforts in the region to provide better information on distribution and abundance of all breeding birds, especially for high priority species;
- Provide basic habitat association data for most bird species to address habitat management issues;
- Provide long-term status and trend data for all regularly occurring breeding species throughout South Dakota, with a target of detecting an average annual rate of population change of $\geq 3.0\%$ per year within 30 years, with power = 0.8 and alpha = 0.1;
- Maintain a high-quality database that is accessible to all of our collaborators as well as to



the public over the internet, in the form of raw and summarized data and;

- Generate decision support tools that help guide conservation efforts and provide a better measure of conservation success.

7) [Effects of deltamethrin on the tiger salamander \(*Ambystoma mavortium*\) at Wind Cave National Park.](#) Investigator: [Brian Smith](#)

Purpose of study: Deltamethrin is a pesticide used by the National Park Service to control the fleas responsible for the spread of sylvatic plague at black-footed ferret (*Mustela nigripes*) reintroduction sites. However, little is known concerning adverse effects on non-target species . Amphibians are routinely described as indicator species and serve as model organisms to study adverse effects of pesticides such as deltamethrin. Tiger salamanders (*Ambystoma mavortium*) are common inhabitants of prairie dog burrows. They are especially abundant at the Bison Flats prairie dog town at Wind Cave National Park , which surrounds a seasonal wetland used as a breeding locality by salamanders living in the prairie dog burrows. This prairie dog town is a reintroduction site for the black-footed ferret and is being treated with deltamethrin.

Approximately 90 acres surrounding the seasonal wetland within the prairie dog town has been left untreated as tiger salamander refuges. Tiger salamanders at Bison Flats are in direct contact with the insecticide, and their abundance at the site makes it a suitable location to study the effects of deltamethrin on vertebrates. Adverse effects could result either directly by absorption through the skin of salamanders or indirectly through consumption or population declines of their insect prey base. Researchers will address three questions: 1) Do tiger salamanders at Bison Flats have detectable levels of deltamethrin in their bodies?, 2) Are there ongoing declines of tiger salamanders at the site, possibly due to the use of deltamethrin?, 3) Do tiger salamanders move from untreated refuges in the prairie dog town to treated areas, making the untreated refuges ineffective as a means to control tiger salamander exposure to deltamethrin?



8) [Risk of Plague to Prairie Dog Populations in Five Great Plain's Parks.](#)

Investigator: [Hugh Britten](#)

Purpose of study: National Park Service policies call for the conservation of native species, natural conditions, and natural processes. Prairie dogs are an especially important natural resource and are frequently cited as a keystone species. Plague is an exotic disease that can decimate prairie dog populations and has been cited as a primary factor threatening prairie dog viability. Five Northern Great Plains' parks, some with significant prairie dog complexes, are on the edge of the known plague zone. It is not known if the disease is already present in the parks at background levels, if the species of fleas that transmit the disease occur in the parks, if the distribution of prairie dogs in the parks can



exacerbate the spread of the disease, and if the genetic characteristics of the prairie dogs make them vulnerable to the disease. This project proposes to answer the questions above and to develop management strategies to reduce the likelihood of plague epizootics.

9) [INFLUENCES OF SPORT HARVEST AND HOUSING DENSITY ON MOUNTAIN LION ECOLOGY](#) Investigator: [Brian Jansen](#)

Purpose of study: The role of human activities in mountain lion ecology has not been examined. We plan to study the influence of sport-harvest has on mountain lion mortality, as well as other population parameters, such as reproduction and juvenile survival. We also plan to investigate the role of humans living in rural areas and in varying densities and



mountain lions survival and disease exposure. This information will be informative to agencies like the National Park Service so that they can evaluate the potential impacts of activities to manage both people and natural resources within specific park boundaries. Because Wind Cave National Park is smaller than typical mountain lion home areas, mountain lions found within park boundaries are affected by human activities from inside and outside of the park. Knowledge of the role human activities are having on mountain

lions outside the park, will give managers insight into what factors are influencing mountain lions found inside the park.

10) [The Role of Prescribed Fire in Providing Habitat for Black-backed Woodpeckers](#)

Investigator: [Christopher Rota](#)

Purpose of study: Black-backed woodpeckers are uncommon residents of northern coniferous forests and are of conservation interest to state and federal resource management agencies in the state of South Dakota. These woodpeckers are attracted to habitat resulting from wildfire and beetle infestations, and new evidence suggests prescribed fire may play an important role in creating habitat for this species. Researchers propose studying space-use and demographic rates of black-backed woodpeckers in the Headquarters West prescribed burn in Wind Cave National Park. The goal is to provide management recommendations for prescribed fires that can provide habitat for this sensitive species and simultaneously reduce the risk of catastrophic wildfire. This study will be incorporated into a larger project evaluating



space-use and habitat-specific demographic rates of black-backed woodpeckers occupying burned and beetle infested forests in the Black Hills of South Dakota.

11) [Estimating population size of Mountain lions using DNA markers](#)

Investigator: [Rebeca Juarez](#)



Purpose of study: To obtain a population estimate of mountain lions in the Black Hills using mark-recapture techniques and DNA markers.

Photo: Preparing to dart mountain lion. Net placed below the lion

(upper center part of photo) in case the immobilization drug takes effect and the lion falls from the tree.

RESEARCH PERMITS FOR CY 2011

Vegetation Related

Permit ID: [WICA-2009-SCI-0010](#) **Study ID:** **App Number:** [51146](#)

Study Title: Bud bank variation and its role in population dynamics of C3 and C4 grasses of the eastern Great Plains

Investigator: [David Hartnett](#) **Start Date:** Jan 01, 2010 **Expiration Date:** Dec 31, 2011

Permit ID: [WICA-2010-SCI-0006](#) **Study ID:** **App Number:** [53772](#)

Study Title: Determine strategies for efficient early detection of invasive plants after prescribed fire

Investigator: [Amy Symstad](#) **Start Date:** May 17, 2010 **Expiration Date:** Dec 30, 2013

Permit ID: [WICA-2009-SCI-0004](#) **Study ID:** **App Number:** [48672](#)

Study Title: Ecological Sampling of Plant Communities

Investigator: [Daryl Smith](#) **Start Date:** Jul 01, 2009 **Expiration Date:** Dec 30, 2014

Permit ID: [WICA-2010-SCI-0008](#) **Study ID:** **App Number:** [53628](#)

Study Title: NPS Inventory and Monitoring Program Plant Community Composition and Structure Monitoring

Investigator: [Michael Bynum](#) **Start Date:** Jun 11, 2010 **Expiration Date:** Dec 31, 2020

Permit ID: [WICA-2010-SCI-0005](#) **Study ID:** **App Number:** [53919](#)

Study Title: Patterns, factors of invasion, and management of the exotic plant *Marrubium vulgare* L. (white horehound)

Investigator: [Elizabeth Gastineau](#) **Start Date:** May 03, 2010 **Expiration Date:** Dec 31, 2011

Permit ID: [WICA-2010-SCI-0001](#) **Study ID:** **App Number:** [51243](#)

Study Title: Plant Community and Ecosystem Responses to Nitrogen Deposition in Two Northern Great Plains National Parks.

Investigator: [Anine Smith](#) **Start Date:** Jan 01, 2010 **Expiration Date:** Oct 31, 2013

Permit ID: [WICA-2009-SCI-0009](#) **Study ID:** **App Number:** [50208](#)

Study Title: Virginia wildrye

Investigator: [Nancy Jensen](#) **Start Date:** Sep 09, 2009 **Expiration Date:** Dec 30, 2015

Wildlife Related

Permit ID: [WICA-2011-SCI-0002](#) **Study ID:** **App Number:** [60242](#)

Study Title: Climate Change and Avian Migration Phenology in the Great Plains

Investigator: [Marcia Wilson](#) **Start Date:** Mar 21, 2011 **Expiration Date:** Dec 31, 2011

Permit ID: [WICA-2011-SCI-0001](#) **Study ID:** **App Number:** [60048](#)

Study Title: Effects of deltamethrin on the tiger salamander (*Ambystoma mavortium*) at Wind Cave National Park.

Investigator: [Brian Smith](#) **Start Date:** Mar 31, 2011 **Expiration Date:** Dec 31, 2012

Permit ID: [WICA-2011-SCI-0004](#) **Study ID:** **App Number:** [60915](#)

Study Title: Evaluate Elk Population Control and Support Adaptive Management at Wind Cave National Park

Investigator: [Glen Sargeant](#) **Start Date:** Feb 15, 2011 **Expiration Date:** Dec 31, 2015

Permit ID: [WICA-2011-SCI-0003](#) **Study ID:** **App Number:** [60927](#)

Study Title: Monitoring of Great Plains grassland birds to assess habitat relationships with grazing and to inform coordinated, regional conservation management.

Investigator: [Kevin Ellison](#) **Start Date:** May 10, 2011 **Expiration Date:** Sep 01, 2012

Permit ID: [WICA-2010-SCI-0003](#) **Study ID:** **App Number:** [53869](#)

Study Title: Monitoring the Birds of South Dakota: Wind Cave NP

Investigator: [David Hanni](#) **Start Date:** May 01, 2010 **Expiration Date:** Dec 31, 2015

Permit ID: [WICA-2009-SCI-0005](#) **Study ID:** **App Number:** [48701](#)

Study Title: Prey Items of Nesting Raptors at Wind Cave National Park

Investigator: [Dan Licht](#) **Start Date:** Jun 15, 2007 **Expiration Date:** Dec 31, 2013

Permit ID: [WICA-2008-SCI-0005](#) **Study ID:** **App Number:** [40206](#)

Study Title: Risk of Plague to Prairie Dog Populations in Five Great Plain's Parks.

Investigator: [Hugh Britten](#) **Start Date:** May 15, 2008 **Expiration Date:** Dec 31, 2012

Permit ID: [WICA-2010-SCI-0011](#) **Study ID:** **App Number:** [56726](#)

Study Title: The Role of Prescribed Fire in Providing Habitat for Black-backed Woodpeckers

Investigator: [Christopher Rota](#) **Start Date:** Aug 01, 2010 **Expiration Date:** Dec 31, 2013

Permit ID: WICA-2011-SCI-0006 **Study ID:** **App Number:** [61888](#)

Study Title: [Actualistic taphonomy of cold & temperate climates: applications for Pleistocene paleontology](#) **Investigator:** [Lauren Milideo](#) **Start Date:** Jul 01, 2011 **End Date:** Dec 31, 2013

Permit ID: WICA-2010-SCI-0012 **Study ID:** **App Number:** [57832](#)

Study Title: [Comparison of bison weights across herds](#)

Investigator: [Joseph Craine](#) **Start Date:** Oct 17, 2010 **End Date:** Jun 01, 2011

Permit ID: WICA-2011-SCI-0009 **Study ID:** **App Number:** [67158](#)
Study Title: [Estimating population size of Mountain lions using DNA markers](#)
Investigator: [Rebeca Juarez](#) **Start Date:** Dec 13, 2011 **End Date:** Dec 31, 2014

Permit ID: WICA-2007-SCI-0002 **Study ID:** **App Number:** [31470](#)
Study Title: [INFLUENCES OF SPORT HARVEST AND HOUSING DENSITY ON MOUNTAIN LION ECOLOGY](#) **Investigator:** [Brian Jansen](#) **Start Date:** Jan 01, 2007 **End Date:** May 31, 2011

Physical Science Related

Permit ID: [WICA-2010-SCI-0004](#) **Study ID:** **App Number:** [52969](#)
Study Title: A Study of Natural Aural Properties and Processes in Underground Acoustic Spaces in Wind Cave National Park
Investigator: [Margaret Sabom Bruchez](#) **Start Date:** Sep 01, 2010 **Expiration Date:** Dec 29, 2015

Permit ID: [WICA-2008-SCI-0003](#) **Study ID:** **App Number:** [38121](#)
Study Title: Cave Climatology
Investigator: [Andreas Pflitsch](#) **Start Date:** Feb 13, 2008 **Expiration Date:** Dec 31, 2012

Permit ID: [WICA-2010-SCI-0010](#) **Study ID:** **App Number:** [56077](#)
Study Title: Evaluate paleoflood resources in Beaver Creek Drainage - Phase 1
Investigator: [Mike Wiles](#) **Start Date:** Jun 24, 2010 **Expiration Date:** Dec 31, 2013

Permit ID: [WICA-2008-SCI-0002](#) **Study ID:** **App Number:** [37881](#)
Study Title: Geologic Mapping of Wind Cave National Park
Investigator: [Brian Fagnan](#) **Start Date:** Apr 01, 2008 **Expiration Date:** Jun 30, 2011

Permit ID: [WICA-2003-SCI-0050](#) **Study ID:** **App Number:** [15832](#)
Study Title: Geology of Wind Cave
Investigator: [Arthur Palmer](#) **Start Date:** Jun 19, 2003 **Expiration Date:** Dec 31, 2013

Permit ID: [WICA-2009-SCI-0003](#) **Study ID:** **App Number:** [46793](#)
Study Title: Ambient Air Monitoring at Wind Cave National Park
Investigator: [Brad Schultz](#) **Start Date:** Apr 03, 2009 **Expiration Date:** Dec 31, 2011

Permit ID: [WICA-2006-SCI-0013](#) **Study ID:** **App Number:** [30140](#)
Study Title: Long-Term Groundwater Monitoring at Wind Cave National Park
Investigator: [Marc Ohms](#) **Start Date:** Sep 16, 2006 **Expiration Date:** Dec 31, 2016

Permit ID: [WICA-2008-SCI-0011](#) **Study ID:** **App Number:** [41897](#)
Study Title: Optimal Lighting in National Park System Caves
Investigator: [Rickard Toomey](#) **Start Date:** Jul 31, 2008 **Expiration Date:** Dec 31, 2011

Permit ID: [WICA-2010-SCI-0013](#) **Study ID:** **App Number:** [58246](#)

Study Title: PALEONTOLOGICAL AND GEOLOGICAL STUDY OF WHITE RIVER DEPOSITS IN WIND CAVE NATIONAL PARK, INCLUDING THE CENTENNIAL, KLUKAS, AND FUTURE FOSSIL LOCALITIES

Investigator: [Rachel Brown](#) **Start Date:** Jan 01, 2011 **Expiration Date:** Dec 31, 2011

AGREEMENTS (WILDLIFE RELATED):

1. **CA (Texas A&M University) – Develop Genetic Based Conservation Management Program for the Wind Cave NP Bison Herd** - Texas A&M University is currently using modern genotyping technologies to determine the breeding structure (pedigree analysis) of the WCNP bison herd and to identify optimum management strategies for long-term conservation efforts. Agreement expired June 30, 2011. Final Report available from resource management office.
2. **CA (Prairie Wildlife Research, Inc.)** – Provide Black-footed ferret services, consulting, equipment and supplies. Agreement expires August 1, 2012. A five year update/report on the Wind Cave National Park ferret re-introduction program will be completed by cooperator.
3. **IAA (USGS Northern Prairie Wildlife Research Center in Jamestown, ND) – “Evaluate Elk Population Control and Support Adaptive Management at Wind Cave National Park”**. USGS is using relocations of elk marked with GPS telemetry collars to evaluate the effects of modified fencing on movements, mortality rates, and elk distribution. Agreement expires 9/30/13.
4. **CA (Black Hills State University) – “Study the effects of Deltamethrin on the tiger salamander (*Ambystoma mavortium*) at Wind Cave National Park”**. Agreement expires August 2012.
5. **GA (Custer State Park)** – establishes standard operating procedures for handling bison exchanges between Wind Cave National Park and Custer State Park.

CA (Cooperative Agreement)

IAA (Inter-agency Acquisition Agreement)

GA (General Agreement)

RESEARCH PAPERS, CONTRIBUTIONS, OUTREACH / PUBLIC CONTACTS, MEETINGS, PRESENTATIONS

- (1) Sargeant, G. A., D. C. Weber, and D. E. Roddy. Implications of Chronic Wasting Disease, Cougar Predation, and Reduced Recruitment for Elk Management. *Journal of Wildlife Management* 75(1):171-177;2011;DOI:10.1002/jwmg.27
- (2) Licht, Daniel S. 2010. Observations of Bobcats, *Lynx rufus*, hunting Black-Tailed Prairie Dogs, *Cynomys ludovicianus*, in western South Dakota. *Canadian Field-Naturalist* 124(3): 209-214. Dan Roddy acknowledged for contributing information towards the publication.

- (3) Komp, M. R., K. J. Stark, A. J. Nadeau, S. Amberg, E. Iverson, L. Danzinger, L. Danielson, and B. Drazkowski. 2011. Wind Cave National Park: Natural resource condition assessment. Natural Resource Report NPS/WICA/NRR—2011/478. National Park Service, Fort Collins, Colorado. Wildlife staff provided data as well as numerous reviews of this document.

Executive Summary:

NPS staff identified key resources that are referred to as components in the project framework and throughout the assessment. The components selected include natural resources and processes that are currently of the greatest concern to park management at WICA. The final project framework contains 20 resource components, along with measures, stressors, and reference conditions for each.

The condition of most park resources, as indicated by the measures defined in the project framework, is of moderate or low concern. However, due to the complex relationship between grazing animals, native plant communities, and other components, any condition determined to be of significant concern warrants concern for many other components.

In conclusion, due to the complexity of the relationships between park resources, it is not possible to make a definitive statement about the ecological health of WICA as a whole.

Wildlife staff took part in the following outreach / public contact activities, meetings, presentations in 2011:

Presented/discussed resource management issues to seasonals, all new employees training tour and advanced ranger training for returning and lead interpretive rangers.

Attended the annual Project Approval Committee meeting (PAC) for the Rocky Mountain Elk Foundation (RMEF) in Rapid City, SD (7/20/11). Wind Cave NP staff member is the NPS rep that is part of the committee that reviews funding proposals for the RMEF.

Member of the Black-footed Ferret subcommittee. Muenchau and Roddy attended annual meeting in Fort Collins, CO, January 2012. Roddy gave presentation on the parks' ferret reintroduction effort.

Presented a powerpoint slide show dealing with the parks' Black-footed ferret reintroduction program. Given at Badlands NP Ferret Festival 9/26/11(30th anniversary of the re-discovery of Black-footed ferrets).

Compiled, edited and submitted the winter edition (17 pages) of the "Resource Ramblings" March 2011.

Shared knowledge about the Park wildlife program with Chadron State University and the University of Minnesota.

Provided information and overview of wildlife issues to “Plus 50” Group.

Led 8 members of the interpretation staff and 2 separate groups from the Student Conservation Association on field days to learn about radio telemetry, wildlife management and plants.

Weber was a field leader for the National Wild Turkey Federation “Jakes” day with 90 5th grade students from the SW South Dakota, to learn about elk and radio telemetry.

Weber and Roddy participated with the SD Game Fish and Parks as part of the ground crew on three Bighorn Sheep capture operations for the collection of biological information and radio collaring.

Field contact for the National Park Service Inventory and monitoring staff for the installation of 6 remote electronic bird monitoring plots. Providing muscle and technical input for the set up of these sites.

Attended the May, 2011 SD Game Fish and Parks game commission meeting to answer any questions the commission had on Wind Cave NP management effecting the setting of elk seasons.



Photo 57 and 58. Duane Weber taking advantage of an educational opportunity to show off a Pale Milksnake to park visitors

Attended the two day Mid-west wildlife disease conference in Keystone SD April 19-20, 2011 as the Wind Cave National Park representative to this 10 state meeting. Gave updates on disease issues at Wind Cave N P as an addition to the state of South Dakota disease report.

Weber was the representative/guest speaker for Wind Cave NP, as the federal neighbor to the North, at the Wildcat Canyon (Lady C) land acquisition/ dedication. The dedication was sponsored by the Rocky Mt. Elk foundation and the US Forest Service. There were 130 attendees at the event. Weber was also the featured speaker at the BBQ banquet that followed the dedication presenting some of the interesting findings of our radio telemetry research (90 attendees).

Weber acted as the field leader for 4 days of volunteer work by a 8 person crew from Kansas “Campfire” program to remove pine from regenerating Aspen stands, and the recovery of abandoned fence material from the back-country of the park.

Muenchau took part in a TV interview on black-footed ferrets with KEVN (Black Hills Fox news).

Provided various wildlife data sets and reports for college students at Northwest College.

INFORMATION REQUESTS:

- Numerous information requests responded to and provided maps/reports/info regarding diseases, bison, GIS layers, prairie dog, ferrets, bison computer program, genetics, research, dusting, birds, coyotes, etc.
- Information shared with Park staff, other NPS units, Inventory and Monitoring Program, Regional and WASO staff, State agencies, USFS, APHIS and USFWS, private citizens, Universities, students, conservation groups etc.

VOLUNTEER HOURS HELPING WITH WILDLIFE OPERATIONS:

- Lindsay Heinrich – BFF Survey – 72 hours
- Christine Bubac (BHSU) – BFF Survey – 22 hours
- Mallory Aaeton (BHSU) – BFF Survey – 15 hours
- Jordan Sheets (BHSU) – BFF Survey – 15 hours
- Justin Tibbitts (BHSU) – BFF Survey – 15 hours
- John Duvall-Jisha (BHSU) – BFF Survey – 15 hours
- Kyle Kennedy (BHSU) – BFF Survey – 39 hours
- Joseph McAllister (BHSU) – BFF Survey, Herp study – 115 hours
- Andrew Wachs (BHSU) – Herp Surveys – 100 hours
- Jason Nies (BHSU) – BFF Survey – 54 hours
- Mark Mazza (BHSU) – BFF Survey – 27 hours
- Mike Laycock – BFF Survey, CBC – 46 hours
- James Tabinski – BFF Survey – 15 hours
- Maike Norpoth – BFF Survey – 32 hours
- Dale Woitas – BFF Survey – 72 hours
- Lori Filipi - BFF Survey – 15 hours
- Doug Buri – BFF Surveys – 24 hours
- Nicholas Altadonna (USFS) – BFF Survey – 12 hours
- Steven Anderson – Bird transects – 80 hours
- Greg August – BFF Survey – 24 hours
- Rudy Badia (RMBO) – Bird Surveys – 150 hours
- Luke Campillo – Bird Survey – 80 hours
- Toni Gould – BFF Surveys – 24 hours
- Amanda Hagerty – BFF Surveys – 48 hours
- Gerald Holbrook – Pdog mapping, Bird surveys, Bison counts – 50 hours
- Angela Jarding – grouse leks – 8 hours

- Caitlin Laughlin – Bird Surveys – 80 hours
- Jill Majerus (WWF) – BFF Surveys – 12 hours
- Jody Mitteis (CSC) – BFF Survey – 12 hours
- Erica Mize – Flea collections (plague study) – 100 hours
- Tony Monroe – Flea collections (plague study) – 100 hours
- Josh Nelson – BFF Survey – 24 hours
- Kelsey Prosser (BHSU) – BFF Survey – 24 hours
- Jared Schmit (BHSU) – BFF Survey – 12 hours
- Taylor Ripley – BFF Survey – 12 hours
- Jake Alsduff – BFF Survey – 12 hours
- Amanda Murphy – BFF Survey – 12 hours
- Larry Stadler – BFF Survey – 12 hours
- Torben Stasch – Wildlife Surveys – 8 hours
- Eric Wilson – Bird Survey – 80 hours
- Rollie Larson – CBC – 8 hours
- Dennis Shreves – CBC – 8 hours
- Jimmy Taylor – CBC – 8 hours
- Sandy Taylor – CBC – 8 hours
- Seth Goodspeed – Elk, Lion Clusters, Cameras, etc. – 84 hours

Total hours = **1785 hours**

The Park waived camping fees and/or provided housing of ~ **\$762.00** for wildlife volunteers to camp in the campground.

44 Volunteers helped the Wildlife Division conduct black-footed ferret surveys, various bird surveys, grouse lek surveys, plague/flea research studies, salamander studies. **We could not have completed this work without the help from our many volunteers.**



Photo 60. Baby badger with mom